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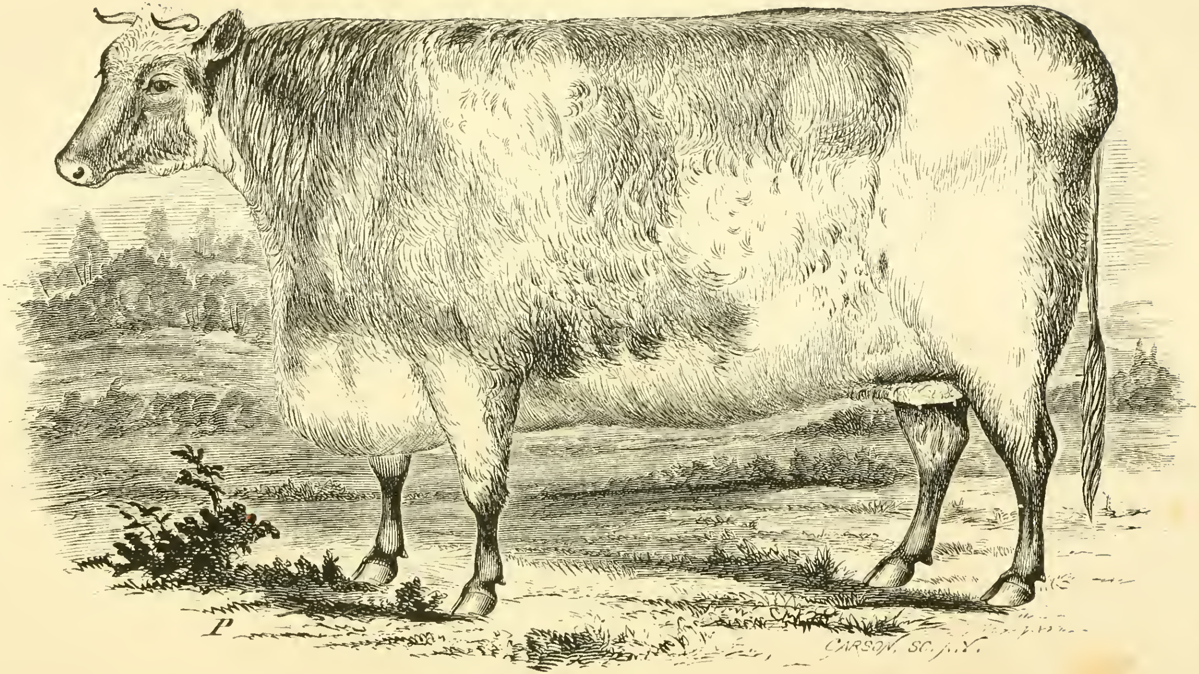
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CARSON, SC. N.Y.

Shorthorn Cow "Aba." See p. 186, Abstract.

# ELEVENTH ANNUAL REPORT

OF THE

# SECRETARY

OF THE

# Massachusetts Board of Agriculture,

TOGETHER WITH

# REPORTS OF COMMITTEES

APPOINTED TO VISIT THE COUNTY SOCIETIES,

# WITH AN APPENDIX

CONTAINING AN ABSTRACT OF THE

# FINANCES OF THE COUNTY SOCIETIES,

FOR

1863.

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BOSTON:
WRIGHT & POTTER, STATE PRINTERS,
No. 4 Spring Lane.
1864.

# STATE BOARD OF AGRICULTURE.

## 1864.

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### MEMBERS EX OFFICIIS.

His Excellency JOHN A. ANDREW.
His Honor JOEL HAYDEN.
Hon. OLIVER WARNER, *Secretary of the Commonwealth.*

### APPOINTED BY THE GOVERNOR AND COUNCIL.

| | Term expires. |
|---|---|
| PAOLI LATHROP, *of South Hadley*, | 1865 |
| EPHRAIM W. BULL, *of Concord*, | 1866 |
| LOUIS AGASSIZ, *of Cambridge*, | 1867 |

### CHOSEN BY THE COUNTY SOCIETIES.

| | | |
|---|---|---|
| *Massachusetts*, | LEVERETT SALTONSTALL, of Newton, | 1865 |
| *Essex*, | GEORGE B. LORING, of Salem, | 1866 |
| *Middlesex*, | JOHN B. MOORE, of Concord, | 1867 |
| *Middlesex, North*, | ASA CLEMENT, of Dracut, | 1865 |
| *Middlesex, South*, | ELIAS GROUT, of Ashland, | 1866 |
| *Worcester*, | HENRY R. KEITH, of Grafton, | 1866 |
| *Worcester, West*, | HOLLIS TIDD, of New Braintree, | 1866 |
| *Worcester, North*, | ABEL F. ADAMS, of Fitchburg, | 1866 |
| *Worcester, South*, | SAMUEL HARTWELL, of Southbridge, | 1865 |
| *Worcester, South-East*, | PERRY WOOD, of Mendon, | 1867 |
| *Hampshire, Franklin and Hampden*, | THEO. G. HUNTINGTON, of Hadley, | 1867 |
| *Hampshire*, | LEVI STOCKBRIDGE, of N. Hadley, | 1865 |
| *Highland*, | MATTHEW SMITH, of Middlefield, | 1866 |
| *Hampden*, | PHINEAS STEDMAN, of Chicopee, | 1867 |
| *Hampden, East*, | ALURED HOMER, of Brimfield, | 1867 |
| *Franklin*, | EDWARD W. STEBBINS, of Deerfield, | 1865 |
| *Berkshire*, | CHARLES O. PERKINS, of Becket, | 1867 |
| *Hoosac Valley*, | SYLVANDER JOHNSON, of Adams, | 1867 |
| *Housatonic*, | HARRISON GARFIELD, of Lee, | 1867 |
| *Norfolk*, | CHARLES C. SEWALL. of Medfield, | 1865 |
| *Bristol*, | SAMUEL L. CROCKER, of Taunton, | 1866 |
| *Plymouth*, | CHARLES G. DAVIS, of Plymouth, | 1866 |
| *Barnstable*, | S. B. PHINNEY, of Barnstable, | 1865 |
| *Nantucket*, | JAMES THOMPSON, of Nantucket, | 1866 |
| *Martha's Vineyard*, | DANIEL A. CLEAVELAND, of Tisbury, | 1865 |

CHARLES L. FLINT, *Secretary.*

# ELEVENTH ANNUAL REPORT

OF THE

# SECRETARY

OF THE

# BOARD OF AGRICULTURE.

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*To the Senate and House of Representatives of the Commonwealth of Massachusetts.*

There seems to be now a reasonable certainty that we shall leave that monstrous curse to the farming interest, commonly called pleuro-pneumonia, as a legacy to posterity, not because it is out of our power to extirpate it, but because we are unwilling to lift a hand with sufficient energy to put it down. The old adage that *delays are dangerous* was never more fully illustrated than it has been in the history of the efforts made from time to time, spasmodic in their character, to get rid of this disease.

Early in March of 1860 it was announced to the legislature that pleuro-pneumonia had broken out in North Brookfield, carried there by cattle bought in Belmont, near Boston, and that it was spreading from herd to herd. The legislature were also promptly informed that a small appropriation would check and exterminate it there. Now, if action had been taken without delay, a very small sum would have effected the object. That is easily and clearly demonstrated by events which subsequently took place.

But a delay of thirty-five days followed, and in the meantime every day and every hour was spreading the contagion, not only by buying and selling, but by the working of cattle in the highways, bringing them necessarily into constant contact, the sound with the infected, so that before the first able commission was really created and ready for duty, under the Act approved April 4th, a very large number of animals had been exposed, and many had become diseased. The danger had increased day by day in geometrical ratio, and the sum appropriated, *which, if granted when asked for, would have been amply sufficient*, was found to be wholly inadequate to effect the object.

As it was, so thorough and efficient was the commission, the disease was extirpated in that section. But a single yoke of oxen had escaped, and could not be traced. Their history is not generally known to this day.

The various steps which have been taken with reference to this calamity, have been fully given in my late Reports, and it is important that this record should be continued. For this reason, I cannot hesitate to give place to the following papers, which have already been presented to the legislature in connection with the address of His Excellency the Governor. With respect to the reports of commissioners, the law requires their insertion here. The first is that of the late commissioners who resigned on account of the refusal of the last legislature to make an appropriation which would make their labors of any avail.

It is as follows:—

*To the Honorable Senate and House of Representatives of the Commonwealth of Massachusetts.*

The Commissioners on contagious diseases of cattle, in their Report of January, 1863, stated that there was not then a visible case of the disease called pleuro-pneumonia existing in the State. In February following, they were called upon to visit supposed cases on the farm of Wm. P. Childs, in Waltham, and subsequently communicated the results of their investigations to the legislature, stating that they were unable to trace the origin of the disease in that herd. It was afterwards ascertained that the disease had existed in Lexington, "in a secret hiding place," for several months previous.

The course taken was first to isolate the herd of cattle in Waltham, after which active measures were taken to discover the origin of the outbreak. The dealer, of whom Mr. Childs had purchased cattle, denied having any reason to suspect the existence of the disease in his herd, consequently the markets where the cattle were purchased were visited, and when no traces of the disease could there be found, it was feared that all efforts to control the malady would be fruitless.

Several weeks elapsed before it became known that other herds were infected, and that many animals had perished from the disease.

The expenses already incurred having exhausted the appropriation of $1,000 made by the legislature, report of the fact was made to the executive department, the opinion of the attorney-general of the Commonwealth was taken as to the individual liabilities of the Commissioners, the result of which was the stopping of all further proceedings, and the resignation of the Commissioners.

To eight herds, in which there was satisfactory evidence that the disease existed, it was ascertained that the infection was communicated by cattle purchased of the dealer before alluded to as having denied the existence of the disease in his herd, and in most cases, the cattle purchased of him, were the first attacked.

It was estimated by the Commissioners in May last, that the expenditure of $3,500, in addition to the appropriation of the legislature, would have arrested the disease at that time. Satisfactory evidence is now at hand that it will require $10,000 to cover the loss since sustained by State, towns and individuals, in consequence of leaving the disease to take its course.

In several instances, where the disease has broken out, the owners of cattle have disposed of them without calling upon the authorities for recompense, and if *all* the cattle that have been exposed to the disease, had been disposed of in such a manner as not to endanger others, doubtless no one would complain. But the character of this disease is so insidious, that it is impossible for owners, or any one else, accurately to determine the existence or non-existence of the malady, and cattle may be disposed of in such a manner as to carry the contagion to many herds; hence the necessity of most stringent measures for arresting the disease at the outset. To accomplish this effectually, there should be in existence an active board of commissioners. The result of leaving the matter to the local authorities of towns has been disastrous. This is owing, in great part, to the circumscribed action of such local authorities. They cannot reach the source of the disease. By the statute, the Commissioners have full power to visit any locality in the State, and require any persons to testify under oath as to their knowledge of the existence of pleuro-pneumonia in their vicinity; hence the fear of detection and punishment deters many from sending cattle that have been exposed to the public markets to be sold; but as selectmen can only act within their own municipalities, such cattle can be sent beyond the town limits and sold without restraint.

If no board of commissioners be appointed, and no active measures are to be taken by the State to prevent the spread of the disease, then it would be important that all laws relating to payments for infected cattle slaughtered should be repealed. Otherwise an unprincipled owner may sell a cow, infected with the disease, into a herd of sixty or more, and the owner of the latter may, when his cattle are taken sick, call in the authorities, and the town and State will be obliged to pay large sums of money, without thereby effecting any thing towards the arrest of the disease.

The importance, as a sanative measure, of checking the spread of a contagious malady like this, has never been considered here as it should be. In England, where the trouble has become wide-spread, through inattention and neglect, active measures are now being taken to counteract the evil. There, strenuous efforts are made to prevent the sale of diseased meat, a business of great extent in that country, and which has just commenced in this. The effect of selling the meat and milk, in that country, of diseased cows, is now known and felt, and even perceptible in its vital statistics. It will be so here, unless prompt and efficient action is taken to prevent it.

Respectfully submitted.

JAMES RITCHIE,
E. F. THAYER,
HENRY L. SABIN,
*Late Commissioners on Contagious Diseases of Cattle.*

BOSTON, December 9, 1863.

*To the Honorable Legislature of the Commonwealth of Massachusetts:—*

Chapter 138, section third, of the General Laws of 1862, provides that "cattle commissioners, now or hereafter appointed, shall keep a full record of their doings and report the same to the legislature on or before the tenth day of January in each year, unless sooner required by the governor."

The undersigned received an appointment as one of the board of Cattle Commissioners, dated June 3, 1863, and was qualified under the same June 17, following. So far as he has learned no additional Commissioner has been qualified. Under these circumstances, having had no authority to transact any business relating to the commission, no report can be made. It is, however, proper to state that official notice was received from the selectmen of the following named towns, bearing the dates annexed, of the existence of pleuro-pneumonia within their several limits, viz.:—

| | |
|---|---|
| Lexington, . . . | June 15. |
| Hingham, . . . | July 4. |
| East Marshfield, . | " 16. |
| Sherborn, . . . | " 17. |
| Dover, . . . . | " 20. |
| Holliston, . . . . | July 21. |
| Ashland, . . . . | Aug. 6. |
| Natick, . . . . | " 25. |
| Waltham, . . . . | Sept. 3. |
| Northborough, . . | " 22. |

Not having authority to give official aid in any of these cases, the undersigned has rendered what assistance he was able in answering repeated and urgent calls for advice.

It would seem eminently proper that if the commission is to be continued, the vacancies therein should be filled without unnecessary delay. Respectfully submitted.

JABEZ FISHER.

FITCHBURG, January 8, 1864.

*To His Excellency* JOHN A. ANDREW:—

Sir,—In accordance with an intimation from your Excellency, I have the honor to lay before you the following account of experiments on pleuro-pneumonia among cattle, made in Cambridge during the past year.

April 10, 1863, a letter was addressed to your Excellency, asking leave to make these experiments at my own expense. This letter was referred to the Committee on Agriculture, and at a hearing before that committee, April 16th, I was requested to state my reasons for undertaking the experiments. These reasons were briefly as follows:—

1. Pleuro-pneumonia is now existing in Waltham.

2. It is admitted, by believers in its contagiousness, that there are two forms of the disease, one contagious, and the other non-contagious, the symptoms and anatomical appearances of which are similar, and which cannot be distinguished otherwise than by the fact of transmission. Consequently each outbreak of the disease requires examination.

3. Experiments upon the contagious, epidemic or local character of disease can only be undertaken at a distance from the place where the disease already exists. Just as the contagiousness or non-contagiousness of intermittent fever (chills and fever) could only be determined by experiments out of the place where it exists.

4. No experiments are known to have been made upon the disease now existing.

April 29.—I was notified that a Resolve had received the signature of the governor, granting me "leave to make experiments on pleuro-pneumonia among cattle, so far as relates to the laws of transmission, at his own expense," and directing the Cattle Commissioners "to place at his disposal cattle belonging to the Commonwealth, for this purpose."

May 12.—In accordance with this resolve, the Cattle Commissioners allowed me to take from a herd in Lexington a cow which had been sick but a few days, and which they believed to be in a good condition to transmit the disease. The cow was carried to Cambridge in a covered wagon, arriving soon after daylight, to avoid possibility of communicating infection on the road.

May 15.—Three cows were received from a herd in Waltham. One of them had been ill four days. The other two were never known to have been ill, although they had been stalled in a barn with cattle ill with pleuro-pneumonia. They were supposed to be perfectly healthy. The sick cow was carried in a wagon; the others were driven, and arrived early in the morning.

May 22.—A cow and heifer were received from Maine, from a region in which pleuro-pneumonia is not known to have existed, and were brought by water to Boston.

The sick cows above mentioned were very sick, and exhibited unquestionable evidence of pleuro-pneumonia. They were kept entirely by themselves, and not allowed to approach the place where the experiments were to be made.

The Experimental Herd now consisted of seven animals, as follows:—

*Two sick cows;* one from Waltham, and one from Lexington.

*Two cows* from Waltham, which had made a part of a herd in which pleuro-pneumonia existed.

*One cow* from Maine, four years old.

*One heifer* from Maine, about two years old.

*One cow*, (a new milch cow,) which had been owned by me two years.

As it was found impracticable to obtain any land upon which the experiments could be conducted, I selected my own grounds, in Cambridge. Here a shed was built, twenty-four feet long by twelve feet wide, open to the south, and closed upon the other three sides. The cattle were secured with their heads towards the open side. They were thus protected from sun and rain, and enjoyed a free ventilation. Around the shed a fence was built, to prevent the possibility of contact with other animals.

May 25.—The experiments were commenced by placing a healthy cow between the two sick ones. She was fed very sparingly, to make her get her food from the two neighbors, by which she would be exposed to their breath as much as possible, and made to swallow any saliva which might be dropped upon the hay.

Each animal was exposed in this manner twenty-four hours, some of them more. After all had been exposed, one of the sick cows was killed, and the existence of pleuro-pneumonia fully confirmed by examination after death. The amount of disease was large; both lungs were diseased; their substance and the pleura investing them. The disease was pronounced, by those present, pleuro-pneumonia, of the same character as that existing in Waltham and Lexington, and believed to be *contagious pleuro-pneumonia.*

The other sick cow was with calf, and was preserved for continued observation. The evidence of the existence of pleuro-pneumonia in this animal was believed by those present to be complete.

All these cows, except my own, were kept, after exposure, in the same shed, but were not allowed to come in contact with the remaining sick cow. They were fed on hay only. They were examined daily, and their condition recorded.

July 11.—Forty-eight days after exposure, the heifer from Maine, which had been recorded as well on the previous day, became sick; she lost her appetite; her pulse and respiration increased in frequency, and she exhibited other signs of fever. On the 13th, disease was discovered, by auscultation and percussion, to exist in the left side. In about a fortnight, this animal had begun to recover her appetite, and her pulse and respiration improved.

The other cows exhibited no signs of pleuro-pneumonia during the time of observation.

August 13.—The weather being very warm, the flies very troublesome, and the observations having now continued eighty days, the Maine cow, the Maine heifer, and the two Waltham cows, were driven to Brighton, and there killed. The appearances after death were as follows:—

*The Maine heifer* was found to have well-marked pleuro-pneumonia of the left chest—the disease was subsiding; the other chest healthy.

*The Maine cow* perfectly healthy.

*One Waltham cow* healthy, except a slight adhesion over fifth rib on *left side*, and the spaces between the two adjoining ribs which could be covered with the palm of the hand. This adhesion was old, of a date much anterior to the commencement of the experiments.

*Second Waltham cow* also healthy, except an adhesion similar in appearance, and equal in age and extent with that just described over the fifth rib on the *right side*. The lung had been mutilated by some one previous to my examination, but contained no evidence of recent disease. No part of the flesh of these cows was allowed to be eaten by any animal.

*My own cow* has continued perfectly healthy to this time.

*The remaining sick cow* had apparently recovered, and on the 31st of October brought forth a healthy male calf, which has grown well, and remains well. Her milk is rich, and of a good flavor.

November 30—This cow was again stalled with my own cow, to commence a new experiment.

It will be seen that the experiments with this herd are not yet concluded. The above are the facts thus far.

*Conclusion.*—It would be rash to draw general conclusions from an experiment so limited. The following are the results thus far obtained:—

1. Only one animal of the five exposed, became diseased during an observation of eighty days.

2. The disease did not prevent the mother from bringing forth a healthy calf, which has continued healthy six weeks; nor has it prevented her from giving good milk.

3. It is probable the heifer would also have recovered.

4. In an economical point of view it would have been unwise, so far as this herd was concerned, to kill all the animals as soon as exposed; whether we have regard to the value of the animals recovered, or the number which *apparently* became diseased *in consequence* of exposure.

These are the conclusion to which a *believer* in the *contagious nature* of the disease would assent.

A believer in *epidemic* or *local* influences as a cause of the disease, would object that the experiments are not conducted at a sufficient distance [six miles] from the place where it is known to be rife; that pleuro-pneumonia is epidemic among *pigs* in the immediate vicinity; that epidemic pleuro-pneumonia among human beings has been known to extend over the whole of New England and New York. In fine, that the herds of Waltham are subject to similar influences as those in Cambridge, differing in *degree*.

These experiments have been undertaken not without considerable expense and trouble; they are offered as a contribution to our knowledge of a most important disease among cattle, with the hope that they may be continued until definite results shall be arrived at, not only as to its contagion or non-contagion, but also with regard to other points interesting in an economical point of view, and not less so as it bears upon the study of comparative pathology. I have the honor to be,

Your Excellency's obedient servant,

MORRILL WYMAN.

CAMBRIDGE, December 23, 1863.

Agricultural Department, State House,
Boston, December 24th, 1863.

*To His Excellency* John A. Andrew:—

Dear Sir,—The disease commonly called pleuro-pneumonia, still exists among the herds of some twelve or fifteen towns of this Commonwealth. The importance of an early consideration of the facts connected with its introduction and spread, can hardly be overstated, whether we regard it in a pecuniary or in a sanitary point of view. If we are to give up all effort to eradicate it, we must settle down into the conviction that we shall soon find ourselves in the condition of those countries in Europe where this disease exists, and from which it is now, probably, too late to attempt to get rid of it, owing to the fabulous amount of the cost.

What is that condition? The most moderate estimates fix the loss by pleuro-pneumonia alone, in the British Isles, at ten millions of dollars a year. The value of cattle lost by that disease amounts to two or three times the value of all the cattle imported. More than a million head of horned cattle died of pleuro-pneumonia in the six years ending with 1860, of a value of at least sixty millions of dollars. Nor is there any falling off, but on the other hand a rapid increase, so that in 1862 the prevalence of the disease, owing to sales in the markets and at the fairs, was greater than it had ever been known before. In one week, about the time I was in London, more than nineteen tons of diseased meat were discovered in that market alone.

These are startling facts, but they do not represent the whole truth. They fall far short of it, for we must consider the contamination of the animal food and of the dairy products of the kingdom, and the almost universal demoralization among a very large class of farmers, dealers and butchers, affecting the whole community, consequent on the reckless traffic in diseased meat.

"Horned cattle," says a recent Report made to the Lords in council of Great Britain, "horned cattle affected with pleuro-pneumonia, are much oftener than not, slaughtered, on account of the disease, and when slaughtered are commonly, except their lungs, eaten; and this even though the lung disease has made such progress as to taint the carcass."

"At present there is a keen competition for a cow affected in the last stage of pleuro-pneumonia, and with an ever-increasing scarcity of animal food, it is of daily, or rather of hourly, occurrence, that diseased town dairy cows realize from five to twenty pounds sterling."

"Live stock insurance companies were formed immediately after the importation of foreign diseases, and these companies found, what farmers had discovered, that it was better to kill for the butcher, than to treat animals affected with disease, so that in many ways, the slaughter of diseased stock as human food has been sanctioned and encouraged."

Professor Gamgee, a man of high scientific attainments as a veterinarian, and having the confidence of the British government as such, says:—

"The traffic in diseased animals is impoverishing stockholders and the country at large. My calculations, made under the most favorable circumstances, show that the United Kingdom never loses less than eight millions sterling (forty millions of dollars,) by disease amongst cattle, sheep, and pigs. Half that loss is annually due to foreign contagious diseases."

"The meat-consuming public is paying fifty millions of dollars a year more now, for the same amount of meat, than it did in 1841, the year before the importation of the disease."

"One inspector (of markets,) said that if he was called upon to exclude from market, animals affected with contagious diseases, he must exclude two thousand animals out of Islington market, on many a Monday morning."

"It was altogether a mistake to believe that diseased meat is sold to the poor. There are many diseased cattle eaten, whose real state could only be told at the time of slaughter."

The contamination of the animal food supplies, "has affected the health of the people to an extent becoming more and more appreciated the more the subject is investigated."

"The tens of thousands of carcasses of diseased animals, sold in large towns, are stealing life from human beings when and where we least expect it."

"Last year," says Gamgee, employed in extensive investigations under the authority and direction of the government, "my opinion became confirmed that the flesh of cattle affected with pleuro-pneumonia, when eaten by man, induces boils and carbuncles to an incredible extent."

His observations were carried on in three establishments—one where fifteen hundred men were known to be supplied with diseased meat; another where several hundred soldiers were in a similar condition; and another where seventy person fed on the flesh of cattle diseased with pleuro-pneumonia. They were "seized occasionally with vomiting, diarrhœa, abdominal pains, &c., and have traced such accidents to the meat to such an extent that many refused to eat it. Circumstances compel me to withhold farther details." *

What a record do these extracts contain! Can any one after reading them,—and innumerable others of a similar import might be added,—avoid the conclusion that anything which may be said or done that shall have the effect to retard prompt and energetic action for the removal of this great curse, now that we have it in our power, is a monstrous play upon human life?

I could give innumerable details to show the similar condition of France, and, in fact, of nearly every country of Western Europe, were it desirable.

But to return. If we have determined to give up all effort to eradicate the disease, as the course of the last legislature would seem to imply, we should, at least, take some action to protect ourselves from the sale of the products of diseased animals thrown upon our markets in the shape of milk and beef, which has already happened, and which is sure to increase.

The law, as it now exists, is quite inadequate for the protection of the community, as the experience of the past few months has shown. The municipal jurisdiction of the officers of towns is too limited to enable them to work efficiently, even if they were, in all cases, fully prepared, with a requisite

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* Since the above was written, the following case was reported in the "Edinburgh Veterinary Review" for January, 1864. The remarks were made by the magistrate at the London Central Court, to a prisoner convicted of the crime of selling diseased meat on the 16th of December, 1863:—

"Mr. Commissioner Kerr, addressing the prisoner, told him he had been convicted, after a patient hearing, of a most serious crime; indeed, he did not know of anything more serious. Death might result from the bad meat partaken of, and if so, of course it was little short of murder. This kind of thing was largely on the increase, and it was his duty to pass a very severe sentence. * * * * The commissioner then sentenced him to be imprisoned for the space of twelve calendar months, at the expiration of which time to pay a fine of £50, or to be imprisoned until such sum should be paid."

knowledge of the disease, to grapple with the facts as they are brought to their notice. But in most cases they are not, and they find themselves embarrassed with duties to perform under the law, with a jurisdiction limited to town boundaries, with no power to put men under oath to elicit the truth, and during the hesitation and delay, incident, perhaps, to imperfect knowledge of their powers and duties, the disease gets beyond their reach by the driving of animals over the town limits, to the great markets or elsewhere, carrying contagion in their way, and infecting other herds. An animal worth less than twenty-five dollars, may thus, as has been the case the past season, convey the infection to and destroy two or three thousand dollars worth of stock. If the evil ended here, it might be borne; but each animal so infected may go out into the community and become a new centre for the distribution of the disease. The injury has no fixed limit, unless we suppose every owner of stock too honest to attempt to realize the full value of an animal that he begins to get suspicious of.

If there could be a cordial and united co-operation on the part of the community, there is still a reasonable certainty that this disease could yet be extirpated.

It is not too much to say that a small appropriation made by the last legislature, from three to five thousand dollars, would have kept the disease wholly in check, if indeed, it had not entirely eradicated it. Now a moderate estimate of the losses during the past season, to individuals, the towns and the State, would be at least ten thousand dollars, and in all probability they have been twice or three times that sum.

But a far more serious consideration than the actual losses which have already occurred, is the fact that the disease has got so much farther beyond control.

There would seem to be no longer any reasonable doubt that the disease is contagious and dangerous to a very high degree. Every step of its history in this State has shown this to be the case, even if it had not already been well known before, from its history abroad. It is generally conceded that of the animals exposed, some twenty or thirty per cent., say about twenty-five per cent. on an average, will die. About twenty-five per cent. will take the disease and still live, but in a condition worse than death, so far as any profitable use is concerned.

Another twenty-five per cent. will take the disease and may, apparently, recover, and the remaining twenty-five per cent. may escape entirely. Such have been about the proportions observed here.

Soon after its introduction into Great Britain, insurance companies for stock were established, most of them with immense capital. They have in most, if not in all cases failed, and that, too, notwithstanding the high premiums charged and readily paid, amounting finally to six or seven per cent.

Let us look, for a moment, at their operation. The "*Farmers' and Graziers' Mutual Insurance Company*" was started in 1844. It had numerous, wealthy and influential patrons. The list of members of the "mutual" soon ran up to an extraordinary extent. The insurances effected, all paying liberal premiums, swelled its treasury to vast proportions. The people were justly and naturally alarmed by continental reports, and glad to avail themselves of an opportunity of security. Now "pleuro-pneumonia, introduced in 1842, cleared out stock after stock and herd after herd in an incredibly short space of time. The company raised its rates repeatedly;" but the disease stealthily spread, and the affairs of the company became hopelessly embarrassed. The books were closed four or five years after it was established, and many still wait their pay for the heavy losses incurred on insured stock.

The "*United Kingdom Mutual Cattle Insurance Company*" started into being in 1845. It had a great business at first, like the Farmers' and Graziers'. There was enough for both to do. But the same cause, this insidious pleuro-pneumonia, brought it down under an enormous load of responsibilities which it had incurred and could not meet.

Ten millions of dollars worth of stock was insured in the first two years of the operation of these two companies. Their business, and of course their receipts, were almost unlimited.

What could be the cause of failure? Some thought there must be a defect in the mutual system. And so they got up a stock company called the "*Agricultural Cattle Insurance Company*," with a capital of two and a half millions of dollars. The stockholders had great expectations, and so had the public. The enormous capital, the high character and responsibility of the parties at the head of the company, the reasonable rates of insurance, and the alarming losses from the spread of this contagion, through exposures in the public markets, naturally led to a business amounting to a million and a half dollars a week for many weeks in succession, after the books were opened. At the end of three years, fifty millions of dollars worth of stock had been insured by the concern, the largest business, at that time, ever done by any similar institution in the world.

What was the result? It was a race against a stanch and long-winded competitor. The cows died. Loss after loss began to stagger even that great company. The official report says, "that in some districts thousands were carried off; so great, indeed, were its ravages that nearly three-fourths of the losses for which claims were made upon the company were the results of that incurable disease."

Then the stockholders got together, again and again; raised the rate of premium again and again, and continued to pay claims. But these losses could never be made up, and this greatest and best managed cattle insurance company that ever existed, after holding out seventeen years, was compelled to wind up in 1861, carrying down with it five other companies to total annihilation. I am not aware that a single similar institution still survives in Great Britain.

Now, if, after a careful calculation that $3\frac{1}{7}$ per cent. premium would cover all the losses that could possibly occur, and after actually more than doubling that rate, the strongest companies abroad have come to utter ruin, can we console ourselves with the hope that such institutions here would meet with any better fate after this insidious disease has got a firm and permanent hold on the lungs of our cattle?

Now a word more on the matter of contagion, because the whole question as to the propriety of legislative action in regard to it, turns, of course, on the contagious character of the disease.

We know it is contagious. We knew it on its first introduction, four or five years ago. The evidence then, as now, was so conclusive and overwhelming that it would seem that any one, who could doubt, with only a limited knowledge of the facts, would doubt all human testimony, even that of his own senses. I could fill many pages with the opinions of the most competent and learned veterinarians as well as practical men, all going to show its purely contagious origin.

I have before me now the written opinions on this point of nearly all the veterinary surgeons in Great Britain, several hundred in number, and, so far as I am aware, not one of them expresses a doubt upon the point.

When I was in Hamburg, in July last, there convened at that city an International Congress of Veterinary Surgeons, composed of the most distinguished professors and veterinarians in the world, many of them of the highest scientific attainments, and admitted as such by scientific men in all departments. The profession is not, in Europe, as it has been here, laboring under an unjust proscription of public sentiment. It attracts to it, therefore, many of the ablest minds and the highest character, men who would adorn any liberal profession by their patient investigations, their ability and their learning. Some of these men I afterwards met in my visits to various agricultural Colleges and Universities in Germany and France.

To show still farther the high character of that body, I may state that so lively was the interest taken in it by the governments of Europe, that four members were sent to it from Russia, *at the public expense*, three from Austria, three from Prussia, and others by the governments of Hanover, Saxony, Bavaria, Wŭrtemberg, Switzerland, Baden, Denmark, Sweden, &c., over eighty in all.

The subject of contagious pleuro-pneumonia was introduced for discussion before this Congress, when it was declared *without a dissentient voice*, that the malady, so far as Western Europe was concerned, was of *purely contagious origin.*

Professor Nicklas, of Munich, stated that "in Bavaria, and all other parts of Central Europe over which his investigations had extended, the lung disease in cattle was purely a contagious disease. In Bavaria it had led to an annual mortality of a very serious nature."

Professor Fuchs, of the University of Heidelberg, drew up a list of contagious diseases which properly came within the scope of legislative enactment, and wished the sense of the Congress in regard to it, as the Grand Duchy of Baden was about revising the laws relating to contagious diseases. Among them the Assembly unanimously included contagious pleuro-pneumonia.

Dr. Warneke, of Kiel, Holstein, says recently : "It becomes every day more evident in this country, that the pulmonary disease is not indigenous here ; that it has not developed itself spontaneously here, but that it owes its presence entirely to contagion arising from the importation of foreign cattle."

Wagenfeld, a distinguished veterinarian, says: "In a paper of mine which I published ten years ago, I expressed my opinion positively against the view that the lung disease was contagious. Now, after making numerous new observations on the lung plague, and subjecting the same to an unbiased critical examination, I find myself constrained to admit that my earlier views were erroneous;—the lung disease is very contagious."

Professor Spinola, of Berlin, had the same experience, and changed his views entirely after long study and observation, arriving at the conclusion that pleuro-pneumonia was a purely and highly contagious disease.

Professor Gerlach, Director of the Veterinary School in Hanover, which I visited in July, a man of distinguished learning and great practical experience, after having made the contagious diseases of cattle a special study, found "that a conscientious investigation of any outbreak of pleuro-pneumonia does not fail to determine in all cases, that healthy stock has been contaminated by diseased animals."

Whatever difference of opinion on the point of contagion there may have been in Europe, ten or even five years ago, it is now very generally, if not universally, believed to be contagious and dangerous by veterinary surgeons and all others capable of forming a correct opinion upon it.

Now let me allude to Prof. Gamgee once more. I like to quote him, because I know him to be honest, competent and trustworthy, while the high and responsible position he has recently held, and I believe still holds, under the government, entitles his opinion to be regarded as sound. "Ten years' anxious study of these important questions," says he, "have led me to form an opinion the very opposite of that which I was first taught to entertain. I was led to believe that the destructive epizootics of the bovine tribe in this country were non-contagious and originating spontaneously here. *I now know*, that we may as soon expect the spontaneous generation of wolves in Epping Forest, as the spontaneous outbreak of pleuro-pneumonia and epizootic aphtha in the British Isles."

On the 1st of February, 1863, this present year, he sent a circular to all the veterinary surgeons in the United Kingdom, making inquiries on this very point of contagion, among others. He got answers from about three hundred, and he says: "I find that all the best veterinary surgeons in this country, whose opportunities are most favorable to arrive at a sound conclusion, attributed these diseases, (foot-and-mouth, and pleuro-pneumonia) to contagion and infection." "Ninety-nine per cent. of the dead cows carted from the town dairy die of contagious pleuro-pneumonia."

And again. "Whatever county I select as an illustration, it will furnish you with the most unmistakable evidence that *our cattle, our soil, our food and climate have nothing to do with the generation of pleuro-pneumonia;* but travelling, buying and selling, transporting by steamers and railways, are the causes which lead to the approximation of diseased and healthy, and thus tend to the decimation of our stock."

The *Italics* are mine, and I wish to call especial attention to this point, because some have attempted to lull the public mind into a false and dangerous security, by trying to have it believed that local causes, as want of ventilation, &c., have generated the disease here among us. It is a most dangerous fallacy. There is not the slightest ground for belief that a single case ever arose in this country from any such causes. It is clearly and unquestionably an imported disease, and if the whole truth were known, every link in the chain would appear, as most of them, in fact, do now. I might go farther and say that it is not generated spontaneously, according to the opinions of those best capable of knowing, in any part of Western Europe. It is probably brought from hotter climates.

Some confusion has arisen from the fact that there are two forms of the disease known as pleuro-pneumonia, one of which is contagious and the other not. The latter has been known among our cattle, to a very limited extent, from time immemorial. I have heard of cases that occurred forty years ago.

The symptoms and anatomical appearances of these two forms of the disease are in some respects so similar, as to mislead a person not familiar with diseases among cattle; but to one familiar with them, the difference is instantly and easily recognized from an inspection of the lungs alone. To him the difference is clearly marked.

Thorough and careful experiments have from time to time been undertaken in Europe, to test the nature and character of the contagious form of this disease, some of them conducted by men of the highest scientific attainments, under the direction of powerful governments, as for instance, by Dr. Delafond, under the authority of the French government. If I mistake not, he and the scientific commission that acted with him experimented with some two or three hundred cows, going through a pretty long series, but I state only from memory, not having their report at hand. No man and no body of men could be found more competent to conduct an elaborate series of experiments in a more scientific and thorough manner, than those who composed that commission. They were the most eminent veterinarians and agriculturalists in France, where the science has been carried to a higher degree of perfection than in any other part of the world. There was Magendie, the president, a host in himself. There was Reynal, the accomplished secretary; there was Rayer, the renowned pathologist; there was Yvart, the inspector-general of imperial veterinary schools; there was Rénault, standing high in his profession; there was Delafond, the director of Alfort, the first veterinary school in Europe, all men of world-wide reputation, to say nothing of M. Mauny de Mornay, the late Minister of Agriculture, Lassaigne, Baudemont, Doyére, and other eminent practical agriculturists. How can we overlook the labors of these men and deny them the character of complete experiments, or say that no experiments have been made upon this disease? Many other careful researches have been undertaken by men equally capable.

At the same time ample opportunities have been afforded, during the last twenty years, for the long and careful observation of intelligent men, and the conclusion has been, among those best informed, that the great practical fact of its contagion is too clearly established to admit of doubt. I believe all owners of stock in England consider it safest to act promptly on the appearance of the disease, and on the theory, or rather on the knowledge, of its contagious character. This is the reason most commonly urged for the universal custom of keeping cattle so fat there. They are generally ready for the butcher on a very short preparation, and are often hurried off without any. I visited dairies, in September last, in the neighborhood of London, where every animal, although in full flow of milk, was in fair beef condition. They dare not buy poor cattle. The loss would be sure to fall heavily upon them.

Is it wise for us, because we do not know the precise period of incubation and all the other laws of this dangerous disease, to delay action till it is too late to act at all?

Is it wise for us to ignore the labors and patient researches of men quite as scientific, to say the least, as any among us, with facilities infinitely greater than any that we can command, and to shut our eyes to the light of their investigations?

Is it wise, during a raging conflagration, to hesitate to pull down a building, even at the loss of some property, if, by so doing, we can prevent the destruction of a vastly greater amount of property?

In what I have said I have no personal interest, either direct or indirect, to subserve, and in urging the facts in regard to this disease upon the public attention during the last four or five years, I have only attempted to do what I conceived to be a public duty. So far from having anything to regret, to retract, or alter, from what I stated at first, subsequent events and a more extended observation have corroborated those statements in the strongest manner. If the community still sleep over this danger, I shall have the melancholy satisfaction of finding, at last, a unanimous public sentiment on this subject. But it will be too late. The result is inevitable. Neglect will and can only lead to unmitigated evil.

If the people are willing to drink the milk of cows, rotten with disease, and to give it to their children, as they have done in Boston, if they are ready to accept the alternative of having the beef of diseased animals brought upon their tables, as has been the case, I have no more to say. But if they desire to avoid this alternative, they will have to act promptly and strenuously for the eradication and stop of pleuro-pneumonia.

If necessary, let a competent inspector be stationed at the principal markets for live stock, with full power to exclude any diseased animal, or to prevent its being entered and sold there. The last able Board of Commissioners had full power to do this, as well as to put men under oath to elicit facts which will otherwise remain concealed, and this contributed more than any thing to keep the disease in check.

The honest dealer could not object to this course. It would be his own protection as well as that of the community. The unprincipled dealer alone would be discommoded, and from him the community has a right to protect itself.

Very respectfully, your Excellency's obedient servant,

CHARLES L. FLINT,

*Secretary of the State Board of Agriculture.*

## PUBLIC MEETING OF THE BOARD AT SPRINGFIELD.

In accordance with the plan adopted last year, and which was announced in the last Annual Report, the Board held a public meeting for the purpose of lectures and discussions, in the City Hall, in Springfield, commencing on the 8th day of December, and continuing four days.

Dr. Loring, as a member of the committee on meetings, called the Board to order, and stated the plan and design of the meeting, and in the absence of the Chairman, was requested to preside. The Secretary occupied the morning and afternoon in the reading of the Report. A discussion arose upon the subject of agricultural education.

Professor S. W. Johnson, of New Haven, gave an elaborate and careful account of various schools and professors in Europe, as witnessed and known by himself. He described the theoretical tendency of all German students, and the zeal and enterprise with which they pursue their investigations in the colleges. His chief reliance, for the success of schools in this country, was upon some great leading mind for each. Where that had been wanting, the experiment had signally failed; and he referred, by way of illustration, to the great farm and imposing buildings which alone remain of one attempt here to establish an agricultural school. Of the Pennsylvania school, and of Dr. Pugh, the head of that establishment, he spoke in terms of great commendation. The Pennsylvania school, combining, as it does, science and practice, is the model school of the country.

Messrs. Sewall, of the Norfolk Society, and Grout of the Middlesex South Society, also took part in the discussion, the direction of which was mainly in favor of an independent agricultural school, disconnected from other colleges in the State.

The evening was mainly occupied with the following Address by Dr. GEORGE B. LORING, on

## AGRICULTURAL EDUCATION.

*Gentlemen of the Board:*—At the last session of the State Board of Agriculture, held in Boston, I had the honor of proposing a new order of annual meetings, of which this is the first, convened as the vote declares "for the purposes of business and discussion." I had previously urged this arrangement before the Board, as some of my predecessors had done, governed by a desire to increase its usefulness, by bringing its deliberations immediately before the farmers of different sections of the Commonwealth, and by connecting its action with the best scientific knowledge of the country. I had learned by constant, and general, and intimate intercourse with the agricultural population, not only of our own State, but of all New England, that there is an ardent desire among them for information of a practical character, based upon the best scientific principles; and I felt that this Board could discharge its duty in no way better, than by devoting at least one of its annual meetings for the diffusion of such knowledge. I trust that the result of this session will prove that I have not been mistaken in my estimate of the inquiring minds of farmers, or of the willingness of scientific gentlemen to aid us in our work, or of the capacity of the Board to conduct such meetings with intelligence and energy. If we succeed according to the full measure of our desires, we may do much to promote the cause of agricultural education in the Commonwealth.

I confess that I was much gratified with the unanimity of the Board in adopting my proposition; and that I was flattered by the selection of the gentlemen from your body who were to unite with me in arranging a plan for the meetings. They had been foremost among the leaders of agriculture, for more than one generation of men. They were among the first to advocate the establishment of agricultural schools, and were really the founders of this Board, the record of whose operations, must have been a source of gratification to them. It was with no ordinary pleasure, that I found myself associated on this committee with the Hon. Marshall P. Wilder, and the Hon. John Brooks.

The committee had but one meeting, at which Mr. Brooks was elected as Chairman, and a list of prominent agricultural gentlemen and *savans*, was prepared, from whom we had a right to expect lectures and debates of a high order.

It pains me to announce to you, gentlemen, that since that time the whole duty of the committee has devolved upon myself. Not that I could be reluctant to labor in such a cause, but that the circumstances which deprived me of valuable counsel and aid are such as must cast a shadow over us all.

The sudden decease of Mr. Brooks, sudden to us, but perhaps not to himself, forewarned and prepared as he had been for a long time, deprived this Board of one of its wisest counsellors, the agricultural community of one of its most zealous and efficient members, and the Commonwealth of one of its most useful and exemplary citizens. He was in all respects one of the yeomanry of our State. Possessed of an ample fortune, he chose the rural walks of life as best fitted for the exercise of his industry and skill, and most promotive of the best faculties of his mind and heart. For his profession he had a profound respect, and was never weary of discussing the position maintained by the farmers of the Commonwealth, as the perpetuators of her vigor and prosperity. He was careful in his investigations, acute in his observations, and prudent in his endeavors to make such improvements on his own soil, and among his flocks and herds, as would commend themselves to every practical and enterprising farmer. He had great honesty and integrity of character, and was remarkable for a tenacity of purpose which usually insured success to his endeavors; and he belonged to that generation of men who gave a dignity and importance to our rural districts, which the temptations and larger opportunities of our growing cities threaten to impair. Without the highest public honors and distinctions, he was a citizen whose example was worthy of imitation, and whose position and pursuits were most useful and valuable.

From the temporary disability of Colonel Wilder, to meet and act with us, we may learn to estimate the value of his active and efficient services in all that advances our agricultural interests. To be deprived, even for a season, of the counsel and aid of the recognized head of one branch of agriculture—of the inspiring energy of the founder of the United States Agricultural Society,—of the zeal of the earliest advocate of an agricultural college,—of the devotion of an ardent believer in agricultural education,—of the tact and sagacity of the director of most of our deliberations, is a loss which we must all sensibly feel at this time, and one which we have reason to hope will not be long continued.

I have said that the chief object of our meeting at this time, is the encouragement by every means in our power, of agricultural education. It was for the collection and diffusion of knowledge relating to the various branches of farming that this Board was established. Previous to its existence, the agricultural journals, and the records of agricultural societies, were the principal sources of information to the farmers of the Commonwealth. The latter productions were chiefly confined to the locality in which they were published, and did not furnish any condensed and well-arranged comparative view of the operations of various sections and counties. From the earliest compilations by the Secretary of the Commonwealth, and the reports drawn up with so much zeal and interest by Mr. Colman, down to the present time, the amount of information collected by the members of the Board and by the indefatigable industry of the Secretary, and distributed by the liberality of the legislature, is large and valuable. That attractive volume, known throughout the Commonwealth as the "Agriculture of Massachusetts, by C. L. Flint," has become a text-book among our farmers, and as a compendium of the efforts of the practical, and the thoughts of the theoretical, is one of the most useful and interesting of our public documents. The well-selected library, and the appropriate and systematic museum, which have grown up under the care of those interested in and connected with this Board, also bear witness to its useful labors. And the relations between the agriculture of Massachusetts, and that of other States, and even of Europe, which have grown out of the organization of this body, are among the most agreeable and valuable of its operations. Notwithstanding the opposition which the founders of this Board encountered, and which has continued in smaller degree to the present time, it has established a community of feeling among the farmers of Massachusetts, which has already served to rouse a spirit of investigation, and has given increased importance to their affairs; as a pioneer in the work of agricultural education, it has done its work well.

It is now peculiarly gratifying that the efforts which have been made here, are but preliminary to larger and more efficient operations elsewhere in the same direction. The addition of a thorough system of agricultural education, to the many liberally endowed institutions of learning in the State, cannot fail, if properly directed, to be of vast service to our people. It is "good learning" which lies at the foundation of our social and civil existence. We have among us no dependent class, upon whom is thrown the drudgery of life, and who are enveloped with a cloud of ignorance, that they may be the more willing servants. The same intelligence which conducts our schools, and guides our hearts, and orders our public affairs, and erects successive monuments of wealth and prosperity, enters into our workshops, and finds occupation on our farms. There may be good farmers in Japan, who are poorly educated, and poorly rewarded for their toil. There may be good cultivators in England, who receive their direction from a superior class in society, and know nothing beyond the details of a subordinate position. There may be an industrious rural population in France, who belong to the soil and to the government. But these things cannot be in Massachusetts. Amid the general elevation of mind here, in the universal diffusion of knowledge, in the eager spirit of inquiry, which form the great characteristic of our people, it is impossible to deprive one great class of our people of that knowledge which belongs especially to them, without striking a blow at the interest which they represent. From the great law of popular intelligence, which the citizens of a popular government have laid down for themselves, the farmer cannot be exempt. The possession and improvement of freehold, be it large or small, demand the exercise of more cultivated faculties, than mere human instincts. In a society like ours, each farm, is as it were, an independent sovereignty, and every farmer is the arbiter of his own fortune. And his success depends not on the readiness and skill with which he obeys a superior, but on the energy, and intelligence, and industry with which he manages his own affairs. So true is this, that a successful American farmer is not a farmer only; he is an influential citizen, a man of intelligence, remarkable for a strong and healthy mind, and for accurate observation. He may not be versed in the rules of science; the chemical laws may be closed to him; the wonders of geology, and the beauties of natural history may be unknown to him; but he has an intimate acquaintance with nature, and a clear comprehension of her processes, gained by placing himself in close alliance with all that she displays about him. He is as well acquainted with the wants of his soil, as if he carried with him the laboratory of Liebig—perhaps better. He knows the capacity of his land; and makes no unreasonable demands upon it. As if by magic, his crops come forth, and offer an abundant reward for that skilful labor which he applies with a sort of instinctive sagacity. And the faculty which enables him to do this, enables him also to maintain that position which belongs to men of large mind and large heart, who enjoy the privileges and bear the responsibilities of civil freedom.

To ascertain the best method of diffusing agricultural education, among a people thus capable of educating themselves, is by no means easy. The knowledge which they have already gained by practical experience and close observation, must not be overlooked. Their fathers chose, with unerring judgment, those fertile spots, which not even the darkness of the heavy forests could conceal from their acute vision; and, with sturdy and untiring toil, they made those old farms which are so well known throughout this State, and which have given evidence for years that they were selected with a thorough knowledge of what good land is. In all the manipulations of common farming, these New England farmers have rarely been excelled. They may be somewhat slow to adopt new theories, or to reject old practice; but they know well what they do know, and they apply their knowledge with economical skill. Give one of these men an acre of good corn land, and he will furnish a crop, which in quality, and quantity, and economy of cultivation, cannot be surpassed. It may not be the nicest and most finished mode of culture, but it is the most effectual. In their judgment of the true value of cattle, they are precise and accurate. They may not talk learnedly of the structure of an ox, but they will select with unerring eye that animal which conforms most nearly to the best rules; and when he is selected, they subdue him to their own service, with such quietness and decision, that he is but an obedient machine in their hands. They can cultivate root-crops, with what seems to be almost a slight of hand. When they turn their attention to the dairy, what a fragrant product they bring forth. There may be larger dairies than are to be found in New England—but none neater, none more reliable. The accomplishment of labor, with the smallest amount of means, seems to be one characteristic of the farming of New England; a knowledge of what to do, and how to do it most easily.

These remarks may not be universally applicable. There are bad cultivators, sluggish hay-makers, indifferent teamsters, careless ploughmen, injudicious feeders, clumsy dairymen, poor cattle husbandmen, and poor shepherds; but, still, the virtues of which I have spoken do exist, and they belong to our best farmers. Whenever the free and untrammeled intelligence of the American has been applied to any point of farming, it has usually insured success. Not far from this very spot, may be found some of the most careful and judicious breeders of cattle, in the world. They have steadily pursued their vocation, until they have enriched the community in which they dwell, and have taught it what good cattle are, and how they can be obtained. As one crop after another failed to be remunerative, how have the farmers of this valley accepted new branches of husbandry, and entered into successful competition with even milder latitudes, in the cultivation of a profitable staple for the market. And to go beyond our own State, can there be found a better illustration of intelligent American capacity, than that presented by the farmers of Vermont in their devotion to sheep-husbandry, and in the degree of perfection to which they have brought their flocks? Half a century ago, they began with their breeding of Merinos, when they were surrounded by all the discouragements which always follow an excited speculation. They soon learned that these animals were particularly adapted to their soil and climate. Observation soon taught them what quality of wool, and what shape of carcass, were the most profitable, and the rules of breeding by which they could be obtained. While the distinguished agriculturists of Europe were applying unbounded wealth to the development of the Merino sheep, these quiet and unknown farmers of Vermont were exercising the judgment, which they acquired by close daily observation ; and in the competition which ensued, all the sheep-breeders of Europe were astonished at the result.

It is knowledge of this kind which we already possess. We have that cultivation of the eye, which however primary and perhaps aboriginal it may be, is nevertheless of the highest practical utility, and belongs to that serviceable information which lies at the foundation of a successful management of the business of life. It is that kind of education, without which all higher culture is of no avail. It is that fundamental principle, upon which can be built the best superstructure. It really constitutes the difference which exists between an education intended to make good farmers, and an education intended to make good members of the learned professions. The lawyer enlarges and strengthens his mind by diligent application to those great principles of law which underlie the structure of all society ; he sharpens his intellect by contests in the courts ; he cultivates his judgment by careful discrimination in the comparison of testimony and in the application of law and precedent ; and he becomes great by the artificial cultivation of great natural powers. The physician and surgeon stores his mind with an accurate knowledge of the human system, its anatomical structure, its physiological laws, its pathological conditions, and learns to apply his information in the operating room, and at the bedside of his patient. The theologian may become profoundly learned in all the wisdom of the schools ; but it is daily service in the ministry which teaches him to bind up the broken heart, and to carry consolation and spiritual truth into the trials of life. The farmer, on the contrary, learns his most practical lesson long before he enters upon his own labors, when, as a boy and young man, he grows up among the scenes and duties of his father's farm. How far soever he may be led beyond all this, by the addition of theoretical education, he will still find that in many matters of skilful and prudent management, his best lessons were learned among the duties of the field, and in the care of the domestic animals about him. I do not say that this is all. It is much, however. And when we remember that excellent farmers have been reared, without any other training than this, we shall understand the true foundation upon which we are to build all theoretical knowledge, and the kind of intelligence which is to be developed and guided by agricultural schools.

The interest manifested in agricultural colleges throughout our country has led me to these reflections. The practical result of these colleges must be, an improvement on that kind of information which I have delineated. These very young men of whom I have spoken, sons of farmers, must be returned to their fathers' farms after receiving the education of a college, better farmers than those fathers were before them, or the grand object of the institution will fail. It is not alone overseers, and bailiffs, and farm-stewards, that we would educate, although a capable foreman is not now easily obtained, and the necessity for them somewhat increases. It is not the sons of merchants and capitalists alone, who should receive the benefit of a thorough agricultural education, in order that they may manage their own estates. But it is a farming community, even now suffering from the want of deeper knowledge, which must receive the largest benefit. Even if an agricultural college cannot make wiser and better farmers than we have already, it should make more good ones, and thus elevate the standard of agriculture universally among us. And whatever may be the class from whom most of the students in such an institution are to be drawn, and whatever may be the subsequent career of these students, it is evident that while the theory of farming in all its highest branches forms a part of the education, the practice of farming in all its minutest details, should form a larger, as it must a more important, part.

It would at first sight appear difficult for a single institution to perform all this. And yet it may be done, it seems to me, directly and indirectly. The institution itself should undoubtedly aim at the highest standard of education in all branches connected with agriculture. It should not deal with the rudiments of a general education. There is no more reason why algebra, and geography, and grammar, and the classics should be taught in an agricultural college than in a law school, or a theological or medical school. Each of these institutions has its specialty, as a part of a university education. And students are required to be already educated in the important branches of a good English education, before they are admitted into that school which is to prepare them for some special service in life. So it should be in an agricultural college. Young men should come there, learned in whatever the common schools of Massachusetts afford, and ready to receive that instruction which they will require when they go out into the world as farmers. It is a thorough knowledge of the natural sciences, built upon a good rudimentary foundation, which should constitute a farmer's education. In agricultural chemistry the student should be expert. In geology, he should become acquainted with the formation of his own soil at least. In botany, he should learn all that can be known of the life of plants, useful and noxious, in order to deal properly with those which come under his own eye. Ornithology should teach him the habits and character of the birds of his farm. Ichthyology may enable him to convert his ponds and brooks into profitable beds for the increase of fishes. In fact, zoölogy, in all its branches, should be open to him. The structure and physiology of animals, the proper forces suited to the various purposes of the farm, the organization best adapted to feed, the laws of animal health and disease, should be made familiar to him. And in all this higher range of science he should be instructed by the most competent teachers, assisted by a well-arranged collection of specimens under the various classes.

Now, when we remember that such teachers as these are to be found mostly connected with our universities and colleges, and that their services are not easily obtained, is it not well to consider how far, under advantageous circumstances, an agricultural college should have a connection with some such institution?

For the study of other branches of education, such as the surveying of land, for division, drainage, &c., the preparation and application of manures, the management of the soil for the various crops, the best methods of seeding, cultivating and harvesting, the selection and care of fruit trees, the use of farm machinery and tools, the process of feeding animals, the rules of breeding, the selection of animals,—for all these and kindred topics, provision should be made for practical teaching. This must be done on a farm itself—not an *experimental* farm, so called, but on a *practical* farm, conducted as a farm should be, with due regard to the income to be derived from the various branches of husbandry.

It might be difficult in the outset to find teachers of these practical matters. But as the college advanced such teachers would be educated, both by labor on the land and among the farm animals, a kind of labor to which some hours of each day should be devoted, in such an institution.

I can conceive of a college, gentlemen, organized in the manner I have suggested in this brief and imperfect form, which would form a valuable part of the general educational system of Massachusetts, and would furnish the means of obtaining the best agricultural education. I am aware that the best mode of conducting a college is still discussed in Europe, where for many years such institutions have been in actual operation. How these various schools are conducted there, your Secretary will lay before you in a careful and elaborate manner, from observations made on the spot, during the last summer. In considering these European schools, we should remember that many of them are amply endowed, and are under the special patronage of wealth and power. Their professors in some of the larger schools established for the advancement of practical science, outnumber the force employed in most of our colleges. Governor Andrew in his address to the legislature of last year, informs us that "The Central School of Arts and Manufactures" in France, counts forty professors and teachers: "The Conservatory of Arts and Trade," has a number not inferior, and has also three subordinate or auxiliary colleges in the provinces. The "Polytechnic School of Vienna" has fifty-eight instructors. Twenty professors are recommended, and Dr. Hitchcock says that "even at its commencement," every institution of the sort should have at least six.

In the division of educational labor which I have suggested, may be found the means of organizing a school here, not with the smallest number of professors practicable, but with a corps of teachers including the best talent in the land, and perhaps in the world.

For the diffusion of the knowledge obtained at this central fountain, many plans might be adopted. I have no doubt that in course of time self-sustaining branch schools might be established in each county, whose teachers might be provided by the college—not large and expensive establishments, but economical practical schools, where the most important branches could be taught, and the most common business of the farm conducted under a competent superintendent. During the winter months, lecturers could be furnished by the college, at the call of associations established in the towns. This latter plan would meet the wants of a large number of farmers, who could not avail themselves of the privileges of the schools, and who are always anxious to obtain reliable information, even amidst the most pressing toil. The value of this mode of instruction cannot be over-estimated. The most important suggestions may be imparted in this manner, and carried into immediate operation by the learner. We need oral teachings, coming with the authority of a school in which all have confidence, to supply a place which is now filled by the doubtful views of those, who need light as much as their hearers.

I have made these suggestions, not because it is a part of the business of this Board to direct what has been committed to other hands, but because I know the interest you must all feel in a subject which has heretofore occupied so much of your deliberations. I am sure that when the college proposed for us is established, this body will be among the first to recognize its usefulness and to feel its good effects. We all know how deficient we are in positive agricultural knowledge, and how valuable to us would be the light of science, in the conduct of our discussions, and in the results of our observations. Feeling as we do, how great a blessing an agricultural school might have been to us, we cannot but expect, that through its influence our successors will far excel ourselves, in performing that duty which devolves upon the Board.

It may be superfluous to urge upon the people of Massachusetts, the importance of education in all its ramifications, considering what they have already done to bring useful knowledge to the door of every cottage in the State. But it has so happened, that while we have educated men for every walk in life,—as theologians, and physicians, and lawyers, and merchants, and mechanics, and clerks,—while we have filled our cities with an intelligent people, we have educated our young men away from the farms. All the active service of importance in this busy Commonwealth, has been drawn from the land. And the time has arrived, when our agricultural interests demand the most careful consideration and encouragement. As the agriculture of our country increases in importance, and labor is drawn into other channels, it becomes us, in our competition with other producing nations, to avail ourselves of all those aids which science and the arts afford, through the accurate direction of toil on the land, and through the best labor-saving machinery. In supplying the markets with the great staple necessaries of life, there is no reason that intelligent American labor should yield to the ruder and more ignorant toil of others. With our diversity of soil and climate, and our capacity to direct our energy aright, we ought to fear no agricultural rivals.

The advancement of agriculture in this country is, at this moment, especially important. We present the extraordinary spectacle of a nation involved in a violent civil strife, in which all the energies of the people are engaged, and at the same time sustaining its business relations, and its currency, above the reach of financial convulsions, and hitherto converting our vast credit into a means of increased and unprecedented prosperity. However wise and able may have been the counsels which have guided our finances thus far, however large the sagacity may be which has controlled our currency with high national honor — the true value of our issue arises from the unceasing industry of our people, extending over a vast area, with diverse interests and labor, and applied to every variety of production. In this work agriculture has performed a very important part. How abundantly have we fed our people from the farms lying directly about them! How amply have we supplied our armies from the land! How intimately has the current of events connected our interests with the great producing regions of the West! For the first time in history, the power of a people combining in large contiguous territory all the arts of commerce, manufactures and agriculture, to sustain itself in war, has been illustrated. Not only have we supplied ourselves, but thirty-five per cent. of all the grain imported into Great Britain during the last year came from our shores, the surplus of our production. While our farmers feel that every pound of wool and meat, and every bushel of corn which they raise, is sure of a compensation, we need have no fear for our agriculture. And while our agriculture is encouraged by home consumption and export, and the protection which government is bound to throw about it, our financial ability and our credit will have an unfailing support.

To intelligent agricultural labor and industry there is yet another appeal. The fortunes of war have thrown into the hands of our government thousands of those helpless and unhappy people whose life thus far has unfitted many of them for self-support. In their behalf, each day, the charities of government are necessarily immense. One of the most difficult and perplexing questions growing out of the events of the times is, What disposition shall be made of them? That they will be sunk in still deeper degradation by a life of idleness and beggary, must be evident to every reflecting mind. That they should be removed from all social control and subjected to military discipline alone, seems to be a disposition of them which presents but little hope. In our vast national domain there are fertile lands lying unoccupied, some yet untrod by civilized industry, waiting for the touch of man's hand to be transformed into beautiful and luxuriant farms. Is there no way by which the intelligent agricultural labor of our country can be induced to occupy these lands, and a system of compensated apprenticeship established, which shall result in securing the comforts of life, and in encouraging the industry and in developing the faculties of these unhappy dependants on our national bounty? It is to labor on the land that they are principally adapted; and it must be by their occupation of the soil in one way or another that they can be made useful and happy. No one can fail to appreciate their appeal to our care. No one can doubt that our government must be anxious and solicitous for their welfare; and if, by well-directed labors on the land, they can be provided for, agricultural industry will have done still another good work in the complicated difficulties which surround us.

For the systematic accomplishment of this object, the establishment of a special bureau is of the utmost importance. Under the existing state of affairs it will undoubtedly be extremely difficult to adopt any one system which will be applicable in all cases and in all sections of the country. As a general rule, the division of land into comparatively small estates, is most in accordance with the genius of our government. And wherever the mode of farming will allow, as in lands adapted to the growing of grain, or the raising of beef, or the supply of local markets, this system is most applicable, and most profitable. The cultivation of such farms, under the guidance of educated agriculturists, to whose care are submitted small bodies of freedmen, must be attended with good results. The system of apprenticeship which might be adopted under the regulations of government, would impose upon every person taking such a farm the obligation of providing for the education, and support, and future establishment of those persons placed under his care. In this way a direct appeal may be made to the industry and intelligence of the employer and employed, and a social organization may be founded in which all men will enjoy their opportunity.

In some sections, on the other hand, this plan may be inapplicable, and circumstances may require the working of large bodies of freedmen under some sort of military control, as an introduction to a state of society requiring less discipline and allowing more independence of action. In order to provide for this diversity, there should undoubtedly be vested in the bureau some power to employ military authority in case of necessity, due regard always being had to the great object in view, viz.: the establishment of social and domestic order and elevation, on the basis of intelligence and morality, and fairly compensated labor.

As an illustration of what may be done in this direction, by discipline, and application, and the employment of a controlling intellect, we may turn to the plan adopted by Colonel E. M. Green on the " contraband farm " near Washington. In July, 1863, Colonel Green took seven farms on the Arlington estate, consisting of one thousand acres of farm land and two hundred acres of garden. There are now on this land 1,020 negroes, of whom only eighty are able-bodied men, the balance being old men, women and children. The wages of men are, under recent orders from the War Department, $30 per month, from which Colonel Green deducts five dollars each month for the formation of a fund to be used in erecting and supporting a hospital, and for contingent expenses. This fund, with the profits of the sale of products from the farm, will amount to $100,000 this year, according to the estimate of Colonel Green. Six hundred tons of hay were harvested last season, and three times that amount would have been secured but for the army operations in that neighborhood. The freedmen there have built for themselves comfortable dwellings, and in the village most kinds of mechanical pursuits are carried on. The tailors, carpenters and wheelwrights of their body, find constant employment. It should be remembered that not long since this useful body of men was a dead weight upon the government. This work has been accomplished by Colonel Green within the last few months, and the facts, as gathered from him, are given to illustrate the efficacy of intelligence in guiding labor to a profitable result. The adoption of some such plan, in various forms, would unquestionably be of vast benefit to suffering humanity, and would lay the foundation of successful agriculture in regions now lying deserted and neglected.

You will pardon me, gentlemen, for the trespass I have made upon your time, in the opening of your deliberations. But you know as well as I, the inexhaustible nature of the subject which we are called on to consider. Agriculture, the most ancient of arts, never rejects the efforts of those who would advance her welfare, by the most modern improvements. The topics which she presents are ever new, while the relations which she maintains to society are the same, "yesterday and to-day." In our own State she has done much for us all, for us and for our fathers, to the earliest generation. She is entitled to our protection and development; and she will never fail.

In an address, delivered before the Massachusetts Society for Promoting Agriculture, by Hon. John Lowell, during his presidency, I find the following words as an encouragement to the energy and care, which that association has always bestowed upon the art, which he loved so well, and did so much to adorn. He says:—

"Let us be patient. Improvement in every branch of industry is slow, but certain; in agriculture, more slow than in any other; but as it is *more slow*, so it is more permanent and more important. Let us all, then, be moderate in our expectations, but *firm* in our reliance on eventual success. Our temperate climate, our natural industry, zeal and intelligence, will not deceive us. New England will be, what she has always been, the nursery of arts, of intelligence, of enterprise, and the abode of virtue, obedience to the laws, and love of liberty. She will never desert her rulers, whether national or State, so long as she is convinced that they consult the *true* interests of the republic. She will forever cherish agriculture as the acknowledged foundation of all national wealth, while she will recollect that her numerous harbors invite her to avail herself of the benefits of foreign commerce, which has raised her to her present comparative importance, and produced a surplus capital, which can, in times of peace, only be successfully employed in manufactures and internal improvements, to which the rare mechanical skill, untiring industry, economy and perseverance of her citizens especially invite her, while her numerous and inexhaustible waterfalls afford her facilities which no other section of the country can boast. Let our maxim forever be, 'a liberal union, without jealousy, of agricultural, manufacturing and commercial interests.' By a strict adherence to this liberal principle, the population of New England must increase in wealth and power—power of the noblest description, most advantageous to the nation, the power of mind; a moral and beneficent power, which ought not to be the subject of jealousy or envy, but which will command the respect of our sister States, while it will essentially promote their best interests."

After the address, a discussion arose upon Agricultural Schools. Dr. Hartwell, delegate from Worcester South, advocated, with much earnestness, the connection of the proposed school in this State with Harvard College, in order that farmers' sons might enjoy the benefit of her professors, libraries, museums, and lectures. E. W. Bull, of Concord, favored an independent organization, and presented his argument with much force. He urged the occupation of a farm where students might learn about cattle, land, forest trees, &c.

Mr. Stockbridge also supported the plan of an independent school. He felt sure that the students in the agricultural branch of a university would be driven into a class by themselves, and would be exposed to the contempt of those above them. He was very strenuous against connecting an agricultural school with any existing college. The expenses of living at any of the large established universities would be an objection, in the minds of farmers, to sending their sons there.

Prof. Johnson said he was not sure of the interest felt in agricultural education. His own lectures on agricultural chemistry were but poorly attended. The courses of lectures delivered in New Haven, some years ago, were somewhat of a failure, and had not been repeated. A college whose professors did not come from the practical walks of farming must fail. Theory without practice is useless. Hence the folly of the doctrine that an analysis of the soil would reveal all its qualities. We need schools to which farms are attached, in order to make them useful.

Dr. Loring said that knowledge is always sought by all who would make a practical application of it. He had no fear that a school in which practical farming was taught would ever languish for want of students. He had no fear of the establishment of a class by connecting the school with a college. Let the education be of the highest order, and all rivalries and jealousies and castes would cease. He urged again the plan by which the best talent of a university could be added to practical operations, as the best foundation of a school of agriculture.

The meeting of the second day was organized by the choice of Elias Grout, delegate from the Middlesex South Society, as President. The topic of discussion for the morning was the

### SOILS AND AGRICULTURAL RESOURCES OF MASSACHUSETTS.

Dr. Hartwell presented some important views with regard to the effects of tillage upon various kinds of soil, and referred to the importance of so introducing manure into the soil as to secure for it the influence of the air for the work of decomposition. He spoke of the effects of drainage, and illustrated by allusion to a piece of land which he had made of great fertility, by grading upon a foundation of stones. Mr. Sewall spoke of the results of mulching on sward land in raising potatoes, and related his own experience, that while mulching was very useful on the kind of land referred to, it was not so useful on old ploughed land. Mr. Colt described, in a very interesting manner, the growth of forest trees on certain lands in Berkshire. Mr. Clement described the loose and porous soils upon which orchards can be successfully grown in the county of Middlesex.

Dr. Loring spoke of the great diversity of soil to be found in Massachusetts. In no State is it so great, unless it be in Maine. The hard granite soils of New Hampshire, the swelling hills of Vermont, with their foundation of slate and limestone, the warm, light lands of Connecticut and Rhode Island, can all be found within the limits of Massachusetts. Her two great valleys of the Merrimac and the Connecticut differ as much as if one stream flowed through Georgia and the other through Kansas. One half of her sea-coast, from Cape Cod to Boston, is sandy and barren; the other half, from Boston to the mouth of the Merrimac, is remarkable for its fertility, as testified to by the productive farms of Marblehead, and Ipswich, and Rockport, and Newbury; as well as by the fine pastures lying on the granite and greenstone ledges of the shores of Essex County. The variety of soil in the interior is also great. Swamps composed of muck, and low lands saturated by springs, abound. On the boundaries of Essex and Middlesex the land is light, sandy, and by no means retentive of manure. On the clayey hills of Worcester and the slaty mountains of Berkshire, vegetation is luxuriant, while the alluvial farms of the Connecticut Valley can hardly be surpassed in fertility and wealth of resource.

In such diversity of soil as this, it is impossible to adopt any one system of agriculture. The management of sandy and light lands, by short and frequent rotations, involving repeated application of manures, will by no means apply to clay districts, where manipulation of the soil is very difficult, and where manure properly applied exerts its influence for a long time. For peat or muck meadows there seems to be but one proper mode of cultivation, and that is by removing them for the purpose of enriching the light lands surrounding them. The drainage of such low, peaty lands is seldom well repaid, as it is impossible to prevent the effects of the stagnant water beneath the porous muck from chilling vegetation on the surface. Moreover, decayed vegetable matter alone will not furnish sufficient pabulum for the higher orders of nutritious plants.

Of the resources of the State, the first in importance is grass. On all the clay lands which have been described it is the great crop. Difficult as they are of management for all hoed crops and gardening, they may be made to yield heavy burdens of grass for many successive years, by care and proper surface manuring. For half a century such lands have been known to yield two heavy crops of grass annually, with a top-dressing of sea-manure alone. Attention to them cannot be too strongly urged. They are among our most valuable possessions. For the lighter lands, composed in part of "yellow loam," corn is the great crop, of which too much cannot be said, and a succession of small grains and grass. Of these small grains, barley seems to be the most universal. There are regions in which it cannot be grown—such as the Connecticut Valley—but, generally, on land in good tilth, it may be made to produce heavy crops. Rye, oats, and buckwheat are also useful.

No efforts have enabled us to make wheat an important staple crop of the State. From the days of Mr. Colman, who urged its cultivation with all his usual enthusiasm, until now, all efforts to introduce it have been vain. For the cultivation of root-crops, few States enjoy better advantages. In all the good dairy districts, the land is peculiarly adapted to the growth of mangolds and ruta-bagas ; and it is encouraging to know that attention to them is increasing. They may do more than any thing else, except grass, to develop the cattle and sheep husbandry of the State. Let the crops referred to be raised on the best lands, and if fruit is to be raised beyond the limits of our gardens, confine it to the ledgy and shelly lands, filled with mineral substances, and difficult of access to the plough, where no superabundance of wood is made, but where the smooth and hardy trees fruit early, and never attain great size, at the expense of their fruitfulness.

In conclusion, it was urged that almost all the soils in the State could be profitably, if only properly, cultivated. It remains for the intelligent and observing farmer to ascertain the crops and cultivation to which his land is adapted, and to adopt a system, which, if carefully pursued, is sure of its reward.

The afternoon was devoted to a lecture, by Prof. S. W. Johnson, of Yale College, on

## THE APPLICATION OF MANURES.

Fertilizers have a two-fold effect: nutritious effect on plants; and the effect of modifying the soil. Certain substances are essential to the growth of plants, which the manures must furnish, if the soil is deficient in them. And these are all the ingredients of plants, except silica and soda. Soil, however, is seldom deficient in certain other substances, as iron, chlorine, magnesia, lime. Whatever nutritious element of soil is deficient, becomes most important in fertilizing. The absence of any one essential ingredient renders the presence of all the others of no account. Manure may act directly or indirectly, in the process of feeding plants. The elements of manure may be taken up at once by the plant, and may act precisely as the elements of the soil, which are available to feed the plant. If we take a barren soil, in which a plant will reach a small growth, the addition of bone ashes or the ashes of wood will make the development of vegetation luxuriant; and if the quantity of these fertilizing materials is properly chosen, we may prove by analysis of the plant that it has absorbed these matters almost completely from the soil. This shows that under such circumstances the fertilizing matter passes at once into the plant. Professor Wolff, of Hohenheim, prepared pots of calcined soil, which alone would not support vegetation; but by the addition of salts of potash, lime, magnesia, phosphates, and salts of ammonia, he rendered them capable of supporting clover vigorously.

Then there are manures operating indirectly by acting on the soil; not on the plant immediately. The application of lime, in large doses, to soils already charged with lime, is beneficial in this way: by acting on the soil it liberates matter already existing there, but in an insoluble state. It would liberate the alkalies, like potash; and if long manured with animal manures it will liberate the inert nitrogen. Lime often has the same effect as guano, by liberating potash, as the solution of guano in the soil does. The action of plaster and common salt is undoubtedly owing to this indirect effect we speak of—the preparation of the soil for nutrition. Recent experiments have demonstrated that a solution of plaster liberates from many soils potash and magnesia. It has been found by comparing the effect of pure water and a solution of plaster on soils benefited or not by plaster, that in the former case potash and magnesia are liberated in considerable quanties; in the latter not at all. Certain minerals which contain silica, alumina, &c., analogous to the composition of soil, and which being formed under conditions analogous to the composition of the soil, may be supposed to exist in the soil, when subjected to the action of saline solution, undergo chemical changes, which throw some light on this indirect action of fertilizers. Minerals of this kind containing lime, subjected to a solution of common salt, will part with the lime, and hold the soda and salt in fixed combination. This new compound, treated with a solution of potash, will lose a portion of its soda and acquire potash. A solution of magnesia will displace the potash again. And, in general, the effect of any one alkali in solution, will be to displace a quantity of some other held in the combination.

Thirdly, manures exert a *physical* effect on the soil. Peat or vegetable matter will often act favorably on soil, by altering the texture. The extremes of dryness or wetness in light or heavy lands are brought by it to a proper medium, although this is not its only action.

The effect of lime on clay is physical to a great degree, as was found by the Lusatian farmers in liming their clay lands to bring them into tillable condition. They found that underdraining produced the same effect. Lime is found, when mixed with moist clay, to increase its bulk and change its texture.

Nearly all fertilizers when applied in large quantities, as stable manure, ashes, &c., produce greater or less alterations in the texture of the soil which are advantageous.

These three modes of action are all dependent one on another, and each fertilizer exerts them all to a greater or less degree. It may happen that many fertilizers which act chiefly to supply food to the plant, in other cases may act by improving the texture of the soil. On many rich soils stable manure does more good by the physical action of the litter than it does by the fertilizing materials which it adds.

The action of manures is influenced by the peculiarities of the soil. Some soils are benefited by plaster and salt, while others are indifferent to these fertilizers; it is probable that the testimony of practical men, asserting that some soils are damaged by these fertilizers, is correct. If plaster acts by liberating potash, its effect would not be manifest on a soil furnishing an abundance of potash to the crops, and large doses of plaster by increasing the solubility, already sufficient, might waste the resources of the soil.

Soils undergo modifications from year to year by tillage, cropping, &c., and thus become subject to new requirements. We often find a course of manuring which has been efficacious for years lose its value and efficacy, and other fertilizers that had been in disrepute are found to be advantageous. On the shores of Long Island Sound fish have long been employed, and have at last proved to have lost their beneficial effects, and on such lands super-phosphate of lime has operated with good effect.

Generally such partial fertilizers as fish, guano, lime, and plaster, are liable to fail after many years and something else is necessary.

Peculiarities of the plant also influence the action of fertilizers. Much experience seems to prove that turnips are specially fond of super-phosphates. Clover grows readily after an application of ashes or plaster, a fact accounted for, perhaps, by the supply of potash which they give.

*Waste of Manures.*—Manures may be lost by direct washing or leaching. The most precious ingredients of manures are wasted in this way—such as potash, phosphoric acid, and ammonia. Salts of lime and soda, especially sulphates and chlorides, are readily washed out; hence they are found in all well-waters. The loss by leaching is, therefore, small, except in the lightest and gravelly soils.

By chemical change manure may be lost, or become inactive. Bousingault found that in the soil of his garden, which had been highly manured for about six centuries, and which contained a large proportion of nitrogen, about ninety-six per cent. of this ingredient was inactive. He limed his garden, and thus rendered a portion of this nitrogen active. When fertilizers are placed beyond the reach of oxygen, by being buried deeply in heavy soil, the chemical changes necessary to render them operative are entirely suspended.

*Loss by Volatilization.*—There need be none, if manures are properly prepared and judiciously applied. Fresh manure in heaps in warm weather undergoes great loss by volatilization. If this process goes on slowly, by throwing litter among it the loss by volatilization is much diminished ; so it would be by the use of sand.

The effect of tillage is not only to facilitate the action of manures, but to dispense with their use to a certain degree. That is, manure with poor tillage is not as efficacious as manure with good tillage. The system of Tull and the Lois Weeden system illustrate this.

*Rotation of Manures.*—It is necessary, so far as the nutritive functions of manures are concerned, to supply each ingredient in proper proportion. It is also important to apply various manures in such order as to maintain the best physical condition of the soil. Thus large quantities of ashes on light soils cement them, and convert them into a sort of mortar. The remedy for this would probably be the application of muck to such soils.

Now, what is the best manure ? Principles and facts above advanced make it evident that we may assert that there is no *best* manure. In any case, that manure is best which makes the best return at the lowest cost. The best return, however, is not always the largest immediate return. A certain degree of permanence in a fertilizer is more important than what is less lasting and more spasmodic. Thus, the succulent grass, grown on that portion of a field treated with plaster, may not yield a greater weight of hay than the grass grown where plaster is not applied ; the excess of green weight being simply water. Lowest cost is not always to be estimated by present expenditure. A large application of lime or marl often benefits a field for a generation ; so may bone-dust ; while the same expense applied in guano might give much less aggregate return.

Generally the best manure is the one which contains all the nutritive matters required by plants : such a fertilizer is barn-yard manure. Barn-yard manure, as the product of cattle which have consumed the crops of the farm, really restores to the soil those ingredients which have been taken away by cropping. Hence it is that the crops usually consumed by cattle, such as corn, small grain, and hay, are usually better cultivated by barn-yard manure than with any thing else. To a farm whose whole product for sale is butter, there is no exhaustion from loss of ingredients, inasmuch as whatever is taken from the soil by cropping is returned in the form of manure. Where cheese is exported, the only loss can be phosphate of lime, and this in small quantity. So that, so far as the nutrition of succeeding crops is concerned, the feeding of previous crops has furnished the means.

The best manure, secondly, is that in which the nutritive ingredients exist, nearly in the proportion in which they are drawn from the soil by cropping. This state of things exists obviously to a greater degree in barn-yard manure than in any other.

Thirdly. The elements of manure should exist in a form best adapted to assimilation. A portion should be ready for the growth of the young plant; other portions should successively come in at various periods of development. No manure supplies these conditions in a greater degree than properly prepared barn-yard manure. And by modifying its mode of preparation, you can adapt it to different circumstances.

As to ascertaining what fertilizer is best in any case—that can be best learned by experience. There is no royal road to fertilization. No chemical analysis, no mode of inquiring into the character of the soil, will infallibly teach us what fertilizing it most needs. The principles which we have enumerated will serve to guide us to a certain extent in this matter. Many practical rules are of great value, all governed by the locality in which they are to be applied.

Positive information can only be acquired by varied and repeated experiments. In case a field appears to demand some new style of treatment, the safest course is to experiment in a small way with all the various fertilizers which are conveniently accessible. It may be plaster, lime, salt, super-phosphate, or a combination of two or more of them, which will accomplish the object. It is important, however, that the result of a single experiment should not be too long depended on.

Professor Johnson was followed by Luther H. Tucker, Esq., of Albany, who enunciated some valuable principles in the application of manure, especially as it relates to top-dressing.

Dr. Loring dwelt on the importance of decomposed barnyard manure, and referred to Dr. Voelcker's experiments to show the increase of soluble salts in this over green manure. He preferred for most crops the application of decomposed manures. For corn, green manure may decompose rapidly enough during the "sixty days of hot corn weather." He reminded farmers that *composting* manures is not necessarily *decomposing* them; and urged them to bear in mind the distinction. Whether in the soil or out of it, manure requires the action of the air to decompose properly.

In the evening, S. L. Goodale, Secretary of the Maine Board of Agriculture, read a valuable paper on dairying. His paper was devoted to cheese making. He said that a milch cow furnished the best and cheapest method of getting human food. The feed necessary to make a pound of meat will make at least twenty-five pounds of milk. Eight and a half pounds of milk on an average make a pound of cheese. In Herkimer County, N. Y., the cows average 400 pounds of cheese per annum. A cow that will make less than her dressed weight of cheese in Scotland is sent to the butcher. England is our great cheese market, for the English eat more cheese than we; 200,000 cows are kept in the single county of Cheshire. Herkimer County, N. Y., first taught the English to use American cheese, and we now ship there more than 40,000,000 pounds a year. Cheese factories are modern, but labor-saving inventions. They require the milk of at least five hundred cows to make them profitable, and a force of five or six persons to do the work. There are more than thirty such factories in Oneida county, N. Y., and the cheese commands a higher price than that made in families. Carrying milk from one to five miles in a wagon improves it for cheese as much as it hurts it for butter. There is little difference in the labor for a pound of cheese or a pound of butter, and the milk necessary for a pound of the latter will make two and a half pounds of the former. Hay cheese is less valuable than that made from grass.

Mr. Flint also read a paper on milk and butter making.

### GRAPE CULTURE.

The meeting of the third day was organized by the choice of Hon. Joseph White, as Chairman.

The subject of grape culture was announced as the topic for discussion, and the time was mainly occupied by Hon. E. W. Bull, of Concord, whose skill and perseverance have placed him in the front rank of the cultivators of that fruit, and at the head of all those who have endeavored to improve the hardy native grape of New England, and to give us a new and valuable seedling adapted to our soil and climate, equally useful for the table and the wine-press.

Mr. Bull said he would invite the attention of the audience to the cultivation of the grape in the field and vineyard, which he believed to be both possible and profitable in Massachusetts. He had, he believed, established the fact, by long experience, that in soils suited to grape culture, and with proper cultivation, the grape was one of the surest of fruit crops, and the most profitable. But in order to succeed in raising large crops of grapes it was necessary that the soil should be dry and warm, and that the cultivator should get perfectly ripe wood, and strong and well-set buds for the next year's crops.

Many writers recommend breaking the soil to the depth of two feet or even more, and making it rich with composts before planting; but he did not believe this to be good practice, but, on the contrary, actually injurious, for the following reasons, viz.: —

The soil of Massachusetts does not get heated, during our short summers, sufficiently for the healthy growth of the grape, to a greater depth than about one foot. Now, if the ground is trenched and made rich, the roots of the vine are coaxed down into the lower and colder stratum of soil, and the wood and buds are not properly ripened, the former being spongy and immature and, as a necessary consequence, the latter being weak and imperfect, so that the next year's crop will be enfeebled, and will ripen later than its proper season. The vine, if a rampant grower like the Concord, will make so much wood as to get out of hand, and make it impossible to prune it much without having such a luxuriant growth of wood the next season as cannot mature, and the evils above stated become chronic.

The grape-grower should always aim to get thoroughly ripened wood. Without this he cannot count on a crop of fruit with any certainty, even if the immature wood survive the winter, for the buds are never perfect until the wood is fully ripe. Let us see, therefore, what method we shall take to obtain this well ripened wood. In the first place, let us remember that the grape requires heat at the root. This is indispensable. Do not, therefore, plant too deep, but let the roots be as near the surface as they will bear without suffering from the droughts that sometimes occur during summer. In dry soils about six inches from the surface will be the proper depth; in stronger soils about four inches. In the next place, it is important that the roots of the vine should not be invited into the cool subsoil by deep culture and rich composts; simply ploughing the land to the depth of nine inches will be sufficient preparation, and thirty or forty loads of compost to the acre—to promote the formation of roots of the young vines—will make the ground as rich as the grape requires, for the grape does not need rich composts; the belief that it does has led to constant disappointment.

It requires *mineral* manures—phosphates, sulphur, potashes, lime. Twenty bushels of bone-dust, twenty of ashes, and five bushels of gypsum make a sufficient dressing for an acre, to be applied once in three years.

It is, however, not enough that the cultivator withholds high culture and applies minerals; he must also prune his vines in such manner in the autumn, and pinch the growing shoots in the summer, as to set back the sap and check excessive growth of wood, the result of which would be spongy wood and imperfectly developed buds near the base of the spurs, where you are to get your fruit the next year. Pinch your growing shoots, therefore, when they have grown twelve or fifteen inches, and again as often as they grow this distance beyond the last pinching, so that a growing shoot will be pinched four times in growing four or five feet. This swells the buds on all the wood to their full size, but does not make them break. If laterals grow out of the axils of the new wood, pinch them in at the first leaf.

The best method of pruning for our short summers is the system called spur-pruning.

The renewal or long cane system exhausts the vine through the necessity of making long bearing shoots annually at the same time it is carrying a crop of fruit. If the vine is strong enough no harm comes to it that season; but if it is *ever* weak, both wood and fruit fail to mature, and your debilitated vine gets a shock from which it may never recover. In the spur-pruning you are sure to ripen the wood, and if the weight of fruit is adjusted to the strength of the vine it will always be strong enough to mature its crop.

Plant your vines in rows, running north and south, that the sun may shine upon and heat the soil to the greatest depth. Let the rows be ten feet apart and plant the vines six feet apart in the row, for the American vine is a strong grower and must have more space than other grapes. The espalier is, perhaps, the best mode of training, though training to poles is a very good, and, some think, the best method; but the superiority of the espalier lies in this, that you do not have to take down the vines, as you must do in renewing the poles, and the pruning is greatly facilitated by the training of the grape on the flat surface of the espalier.

Aspect and soil greatly modify climate. A south aspect is best, and a hillside, if not so steep as to make cultivation impracticable, is much better than level land. Western aspects are better than eastern, for the sun warms the western slope in the latter part of the day, and this afternoon sun is of great service in the autumn, when the grapes are ripening. There will be fully ten days difference, in the time of ripening the crop, between a warm soil on a southern slope, and an eastern slope with a stronger soil. Yet in a strong soil, treated with the mineral manures before spoken of, the skilful cultivator will not fail to ripen his crop. The points made were that the soil should not be too rich, that the culture of the soil should not be too deep, that the wood should be well ripened, and the vine should not be cropped too heavily.

As to the amount of crop, the vine may safely carry five pounds to a vine the third year after planting, ten pounds the fourth year, fifteen pounds the fifth year, and twenty pounds the sixth year, and thenceforward may be surely counted on, if the vines are healthy, as they will be if treated as before advised. This is equal to about thirty-five hundred pounds to the acre for the first crop, seven thousand pounds the second year, ten thousand five hundred pounds the third year, and fourteen thousand pounds the fourth year, in round numbers.

After some remarks on the best methods of propagation and planting the grape, Mr. Bull invited the attention of the Board to the improvement of our hardy native stock by raising seedlings from it. He had been engaged in this work for more than twenty years. His Concord grape was obtained in the second generation from the original *Vitis Labrusca* of New England, the most hardy stock in the country, and adapted to all the vicissitudes of our climate. Seedlings from the Concord showed still further improvement, both in texture and flavor, and it was not too much to expect that we shall yet have grapes quite as good as the best foreign grapes, which shall also be perfectly hardy and adapted to vineyard culture. The grape for this country must be as purely American as are our politics and our people. He hoped others would take up this really national work, that our final success might be more rapidly achieved, for the seeds of the same grape would show greater variation from the original type when grown in various soils and aspects, than upon that soil where it originated, where all the conditions of soil, culture, and aspect were the same always. He would be glad to furnish seeds to those cultivators who would be willing to grow them; and he was satisfied that no more useful and profitable occupation could be adopted than the raising of various seedlings suited to various localities. The vine is much modified by the soil, climate, and aspect in which it grows. He would not recommend beginning with the native grape in every locality, but the selection of a good, hardy, cultivated variety. He offered to furnish seeds of the Concord, for the purpose of giving a starting point, far in advance of the Vitis Labrusca.

The discussion in the afternoon was upon farm crops. It was opened by E. W. Stebbins, of Deerfield, who gave his views upon the kind of hay best adapted to feeding cattle. He had satisfied himself that fine hay, such as redtop, rowen, &c., is preferable to the coarser varieties for feeding cattle. Timothy and clover he did not consider profitable food for fattening purposes. He recommended tobacco, wheat, and grass as the best crops for the farmers in the Connecticut Valley. Sixteen hundred pounds of tobacco, thirty bushels of wheat, and two and a half tons of hay are the average crops of this section. Moses Stebbins, of South Deerfield, advocated high cultivation of the soil as the best mode of profitable farming. He spoke earnestly against careless and negligent husbandry, and gave many facts drawn from his own experience and observation to sustain his position. C. O. Perkins, of Becket, described with great minuteness the crops of Berkshire. His account of the corn crops there was very interesting. From one hundred to one hundred and thirteen bushels of corn to the acre were raised in many instances, and in one case sixteen acres were raised without manure, averaging one hundred bushels to the acre, and costing ten cents per bushel. The luxuriant growth of such corn was well described. The potato crop in Berkshire had been successful the last season, three hundred and eighty bushels to the acre having been raised on large tracts of land. Mr. Perkins recommended, very justly, the raising of oats and barley, mixed, for fodder.

Dr. Hartwell followed Mr. Perkins, in an interesting account of his method of raising corn. He would plant his corn three with forty cart-loads of manure to the acre. He could raise manured feet apart in hills, making 3,555 hills to the acre; and he in this way eighty bushels of corn to the acre, at a cost of $15. He found it easy to raise fifty bushels of oats to the acre, and hay at the rate of three tons per acre.

The lecture of Professor Agassiz, in the evening, was upon the work performed by glaciers in preparing the soil of temperate regions for cultivation. He commenced, however, by discussing the plan of an agricultural college, and the importance of agricultural education. He would aim at the highest science as the foundation of practical knowledge. It was not to be expected that the philosopher, who devotes himself to the work of exploring the secrets of nature, could also take part in farm labor. He must be so educated as to establish the principles on which such labor can be profitably conducted, and raise the mind to the highest contemplation. He enlarged upon the necessity which rests upon us as a people to lay the foundation of our greatness upon sound learning; else we may be Carthagenians by nature, and enjoy a Carthagenian fate. He recommended the attachment of the agricultural college in this State to Harvard University. The enjoyment of the libraries, museums, lectures, &c., of that institution, he considered of immense advantage to the student who is exploring the sciences which belong to the work of cultivating the earth. To illustrate how intimate the connection may be between science and practical labor, and how the former may lead the mind of him who is engaged with the latter on to deeper interest in his work, he proposed to describe the part which glaciers had performed in pounding the rocks of past ages into soil fit for cultivation. He described that condition of the earth, when a sudden winter shut down on the northern latitudes and entrapped the animals of warmer regions in cases of ice. Then the work of glaciers north of thirty-five degrees, north, and south of thirty-five degrees, south latitude, began. He described by diagrams the movement of these masses of ice, driven on by the accumulating weight in the rear, and thawing at the foot under the influences of a southern sky. And as the work went on, the rocks and hills were disintegrated for the benefit of after ages of civilized agriculture. The lecture was full of interest and of important facts.

Friday, Dec. 11th, the Board met at ten o'clock. Henry Colt, Esq., delegate from the Berkshire Society, was called on to preside over the deliberations of the Board, when the topic discussed was

### CATTLE BREEDING.

Prof. Agassiz, who was present, was called on to give his views upon the subject. After expressing some sound sentiments with regard to the connection between science and practice, and showing how the two ought to be connected in the business of agricultural education, he entered into an elaborate lecture upon the laws of reproduction, and their connection with the breeding of farm animals, as an illustration of the vast importance of profound science in guiding the farmer in his work. He has found by experiment that the process of fecundation was governed by some extraordinary laws. The common turtle, for instance, does not commence to breed until it is seven years old. At the second year, connection between the male and female takes place, without any apparent result. The third year connection takes place, and still no eggs. And so on until the seventh year of the life of the female, when she commences bringing forth maternal eggs. At this time the eggs in the ovaries present various sizes as if they had been impregnated at the different periods. Certain very curious facts in the reproduction of other animals, go to show that the impregnation of an ovum may take place a long time previous to its development, and that it probably only requires the stimulus of future connections with the male, to bring it into existence. He had experimented with a Newfoundland bitch, by coupling her with a water-dog, and the progeny were partly water-dog, partly Newfoundland, and the remainder a mixture of both. Future connections of the same bitch with a greyhound, produced a similar litter, with hardly a trace of the greyhound. He had bred rabbits with the laws established by this experiment, and had at last so impregnated a white rabbit with the grey rabbit, that connection of this white rabbit with a black male invariably produced grey. A fact stated by Mr Chapin, of Milford, that a hen turkey would lay two or three successive litters of eggs, having been impregnated only for the first litter, was new to Prof. Agassiz, and confirmed his views. It was undoubtedly with a knowledge of these laws of reproduction, perhaps profounder than that which we possess, that the Jewish code declared that if a widow having children marry again, the children of her second husband shall be heirs of the first.

These laws, established by these experiments, should govern us in our breeding of animals, and should make us careful in a selection of males for the first impregnation of females, as upon this depends the future value of the female in producing the type which the breeder may design.

Certain more subtle influences are exerted by the two sexes, one upon another, by mere social intercourse. A high-toned and healthy association of men and women in society, is of vast advantage to both in a physical point of view. The absence of this virtuous familiarity in this country, is the cause of great detriment, to women especially. So much is this the case, that certain diseases known to women in this country, are unknown in Europe, where, in the market-place, and in the field, in school, in church, in the street, at home, that ease and familiarity of intercourse, which expel everything morbid and unhealthy are the common mode of life. He urged, on this ground, the commingling of the two sexes in our schools and public places, as beneficial to both, physically, as well as morally and mentally.

The lecture threw much light on the subject of breeding and rearing cattle, and clears up many points which have always been troublesome to the breeder.

In conclusion, Professor Agassiz dwelt upon the influence which soil and climate exercise in developing the animal system. Large frames, great bony structures, grow on limestone soils, smaller bones on granite formations. He thought this ought to be taken into consideration in selecting animals for any locality. And he was moreover satisfied that a breed of animals could, if confined to any given spot, grow into conformity with that spot.

Dr. Loring remarked that the views Professor Agassiz had presented, especially with regard to the influence of the first impregnation, had often been confirmed by his own experience. He had urged in a report on Cattle Breeding, published in the State Agricultural Transactions, the selection of a male as near the type of what the breeder wants, as possible, and of a female which had never been impregnated, for the purpose of producing a specified type. He had urged, too, the case of a male somewhat connected with the females, which he proposed as the foundation of a race; because he believed in a certain amount of in-and-in breeding, especially when healthy constitution and good points were thus to be transmitted. And now, more than all, on the principle of surrounding influences, and of the value of the relations which exist among animals as well as among men, would he urge the necessity of establishing a class of animals, a family perhaps, particularly adapted to every locality, and kept distinct for that locality. He deprecated this mixing of Ayrshires, and Jerseys, and Short-horns in the same pastures, and on adjoining farms, as especially injurious to all the breeds, even if they did not intermingle. It is impossible to establish a desired type in the midst of such confusion. That the care in avoiding this tumult in the cattle community which he recommends is advantageous, he illustrated by referring to several localities in New England where, in an isolated manner, strongly marked and valuable families of animals had grown up.

Professor Agassiz here confirmed these views by reference to the animals which represent, with great distinctness, the cantons of Switzerland.

Dr. Loring reviewed his remarks, and spoke of the advantage the breeder in America could derive from taking those herds of cattle in Europe, already established for some specific purpose. And lest some one might charge upon him that the views of Professor Agassiz with regard to breeding rendered this unnecessary, we would only say that if we had breeds in this country adapted for specific purposes, we would not go abroad for them. But we must do this so long as the present style of chaos exists here.

He then spoke of the rule he had adopted in breeding Ayrshires. He had first fixed the type of animal which he desired to obtain, and having done this, he had selected a male of the proper standard, and had not gone beyond his own herd for succeeding males. He did not mean to say that his type was better than that of any other breeder, but it was what he himself wanted, and he could perpetuate it, and he thought bring it to perfection, by the system which he had adopted.

Mr. Wetherell joined in the discussion, and advocated very strongly the use of pure blood.

Professor Johnson sustained the principle of in-and-in breeding, especially when valuable qualities were thus to be perpetuated; and as the first practical application of the rule that "like produces like." He gave a very interesting account of the stallions in Germany, where experiments in breeding were carefully made.

SHEEP HUSBANDRY occupied the time in the afternoon. Dr. Loring commenced the discussion by referring to the extraordinary stimulus which had been given to wool-raising in this country, and to the fact that, when properly pursued, it had always been profitable. He spoke of the various ineffectual attempts which had been made to introduce what are called coarse-woolled or mutton sheep, upon the soils of New England. The cold of winter, the heat of summer, the uneven, hilly, and rugged surface of our short herbage, all militate against heavy, fat-producing sheep.

It is very difficult to keep these breeds, such as Leicester, Cotswolds, and Oxford Downs, up to their standard. They have a constant tendency to deteriorate, which nothing but the most expensive feeding will prevent. In a few instances, where a small farm is convenient to the market, and a flock of fifteen or twenty sheep is all that the farmer can manage or his farm support, it is possible that a few coarse-wooled ewes may be kept with reference to the lambs which they will produce. And yet when we consider the capacity of such for consuming food, and the small amount of wool which they produce, it will be found that a lamb raised under such circumstances, is a pretty expensive luxury after all.

While the breeds of sheep which have been referred to, have degenerated as a general thing on New England farms, the smaller, and hardier, and more profitable Merinos have improved steadily on the original importations. The Vermont Merinos are far in advance of the Merinos of old Spain, and of all Europe, as was shown at the exhibition at Hamburg. So also are they far in advance of the Merinos brought here by Consul Jarvis. They have found a soil and climate peculiarly favorable to their growth and development. They are hardy, and easily kept in large flocks, on scanty pastures in summer, and on an economical supply of food in winter. They have been wintered well on oat straw and potatoes—food which would have failed entirely to support the heavier and coarser breeds. They produce heavy fleeces at a very small cost, and they are fattened for the market at a comparatively small expense. They, in reality, constitute a large proportion of the mutton which is driven to market from the north and west; and even when grass fed alone, they have a compact and solid carcase, very heavy in proportion to its size, and of excellent quality and flavor. It is generally conceded by those who fatten mutton by stall feeding, that the Merino wether is the most profitable animal that can be fed for such a purpose. And he did not doubt that mutton might be produced, as secondary to wool, in such a way as possibly to remunerate the feeder.

So much for the mature animal food which the sheep will produce. In its best condition, it is well marbled, not loaded with superficial fat, but abounding in well-flavored meat. The Merino mutton of New England and the Northwest compares favorably with the mountain mutton of Scotland and Wales—that mutton, which the English breeder of Cotswolds uses on his own table, while he disposes of his own fat-laden animals for the consumption of those who make an economical diet by using an excessive amount of fat in soups and otherwise.

Mr. Stebbins, of Deerfield, here asked the Doctor whether he did not consider lamb highly nutritious and palatable? He replied that no immature meat like veal and lamb, is as nutritious or digestible as the flesh of animals fully grown. Heat, suddenly applied, coagulates the albumen and gelatine of such meats, until they are very indigestible; and they are not such food as will sustain men in hard and constant labor. He advised against their general use.

But he thought, that whatever the quality of different kinds of meat might be, the farmers of Massachusetts had only to settle what kind of sheep is best adapted to their own farms. To determine this they had only to look abroad over their own State, and see where the most successful sheep husbandry had been carried on. Our best sheep farmers are in Berkshire—not that they have any better soil or climate for sheep than can be found elsewhere in the State—but they have devoted themselves to that branch of sheep husbandry which is really profitable. They had the same latitude and the same feed as Worcester County and other parts of the State; but they had better sheep. And it is one of our agricultural misfortunes that their example has not been followed. Many portions of our State present admirable facilities for sheep farming. Those pastures in and around Brookfield, which were swept by pleuro-pneumonia, offered every inducement for the business. And yet they had been stocked again and again with a class of cattle of doubtful benefit; and whenever sheep had been placed upon them, it had been the coarse-woolled varieties, whose owners had been glad to speed their departure.

Mr. Wetherell of Boston, as strongly advocated the keeping of mutton sheep in the neighborhood of large markets as most profitable. We cannot compete with the West, and with Texas and South America in raising fine wool, as we can in supplying our markets with mutton and lamb.

The discussion was continued by Mr. Tidd and Mr. Walker. At the close of this debate, the Board adjourned.

## ANNUAL MEETING IN BOSTON.

The Board met in Boston the 26th of January. It was—

*Voted*, That the State Board of Agriculture have read with great pleasure the communication of the Secretary addressed to His Excellency the Governor, upon the subject of pleuro-pneumonia, and they fully agree with the Secretary in the statements and recommendations therein made.

*Voted*, That in the opinion of this Board, immediate action should be taken by the legislature to stay the progress and insure the eradication of this disease, and that a committee of three members be appointed to present the views of this Board to the legislature, and to appear before such committees of the legislature as may be appointed to consider the subject.

Messrs. Loring, Lathrop, and Moore were appointed as this committee.

On motion of Mr. Stedman, a committee of three was appointed to report a plan of proceedings for the session: Messrs. Stedman, Bull, and Colt. The Secretary was subsequently added to the committee.

This committee subsequently presented the following—

## REPORT.

The Committee on the preparation of business for the present ession of the Board, report—

1st. Reports of Delegates to the County Societies.

2d. Essays. Preparation of Land for Crops, with special reference to Drainage.

3d. Management of Forest Trees, including the planting of Pines on the seacoast.

4th. Fruit Culture.

5th. Profit and Expediency of Growing Meat in this Commonwealth.

6th. Any of the topics not enumerated above.

The committee recommend that each subject assigned at the last annual meeting, and not to be reported upon at this session of the Board, be discussed by the Board at its present sitting, and continued in the list for the current year.

Pleuro-Pneumonia.

As another subject, we recommend a free discussion upon the establishment of an Agricultural College in Massachusetts.

We also recommend that at least two public meetings for Lectures and Discussion, be held in the Representatives' Hall, provided leave of the House be first obtained.

P. Stedman, *for the Committee.*

This report having been adopted, it was–

*Voted*, That a committee of five be appointed by the chair to propose some plan by which this Board can aid in the formation of a New England Agricultural Society, and to report at this meeting: Messrs. Loring, Saltonstall, Stedman, Lathrop and Moore.

That committee subsequently submitted the following

## REPORT.

The Committee, to whom was referred the establishment of a New England Agricultural Society, would report:

One of the most efficient methods of obtaining agricultural information is the examination and comparison of the animal and vegetable products of different sections, one with another. It is not the interchange of thought alone which rouses the faculties to action, but the actual inspection of the results of labor and skill and ingenuity, applied to various wants and necessities.

In no section of our country is there such an opportunity presented for investigation of this sort as in New England, with its various soils, and climates, and markets.. There is in New York, a similarity of agricultural enterprise, guided and shaped, no doubt, by the leading agricultural minds of that State. In Ohio there is a prevailing purpose throughout the length and breadth of her fertile valleys and plains. In Pennsylvania, and Illinois, and Kentucky, there is for each a certain identity of agricultural interest confined within the boundaries of these States, and each one of them presents an area so large as to require a separate agricultural society for itself.

New England, with an extent of territory not much larger than any one of the States referred to, has a great variety of agricultural operations governed by the wants and skill of the various States and sections. Maine has her families of cattle and horses, naturalized by many generations upon her pastures and under her skies. New Hampshire presents her breeds also with their characteristics. Vermont stands unrivalled with her horses and sheep. Massachusetts, with her diversity of soils, has her varieties in great proportion. Rhode Island and Connecticut have their types of valuable animals introduced with skill, and bred until they are, as it were, indigenous.

So, too, of the crops of these States. From the remotest parts of Maine, and New Hampshire, and Vermont, to the southern borders of Connecticut and Rhode Island, may be found almost every variety of vegetable growth which is profitably raised in northern latitutes. Oats in the colder regions, corn on the warm plains, grass upon the heavy bottoms, tobacco in the warm valleys, fruits of every description, grapes upon the ledges, cranberries on the swamps, apples upon the hills, and pears in the warm and rich and sheltered gardens, all find within the limits of New England appropriate and congenial spots.

For the encouragement and comparison of these various animal and vegetable productions, it is proposed to organize a New England Agricultural Society, at whose exhibitions may be collected the best specimens of all articles of interest to the farmer. There can be no doubt of the beneficial results of such an institution upon the agricultural interests of the New England States; and there can be no doubt of the new bond of attachment which might thus be developed.

It is not the intention of the Massachusetts Board of Agriculture to direct in any way the plan or organization of the proposed society. The object is simply to call the attention of the various agricultural societies, and of those interested in agriculture, to the proposed association, and to urge upon them the importance of lending their aid to the enterprise. It is suggested, therefore, that a meeting of delegates from the various agricultural associations in New England, shall be held on the first Wednesday in March next, in Worcester, in connection with the Stock Breeder's Association, which meets there on that day. We would urge upon all societies the importance of joining in the movement. It is only with their co-operation, that the association can be formed. The labor of securing members can be divided among the officers of the various societies; and a large and popular association can thus be easily organized.

The committee would report the following Resolutions:—

*Resolved*, That the organization of a New England Agricultural Association is worthy of the consideration of all who are interested in the agriculture of this section of our country, and are desirous of its development and improvement.

*Resolved*; That the various agricultural associations in the New England States are hereby urged to send delegates to a meeting to be held in Worcester on the 2d day of March next, for the purpose of considering the question of the proposed organization.

*Resolved*, That a copy of this report be forwarded to the presidents of all the existing agricultural societies in the New England States, by the Secretary of this Board.

On motion of Mr. Keith, the subject of the agricultural college was then taken up. Messrs. Bull, Converse, Tidd, Stebbins, Stedman, Smith and others participated in the discussion, all expressing the opinion that an agricultural institution should be independent and disconnected with any old existing institution, and that a central location, or one in the western part of the State, would be preferable, other things being equal.

*Voted*, That a committee of three be appointed by the Chair, to prepare resolutions expressing the opinion of the board in regard to a location for the agricultural college.

Messrs. Sewall, Stockbridge and Clement were appointed to act as such committee.

This committee subsequently submitted the following:—

*Whereas*, It is a maxim, universally recognized, that national strength, security and prosperity are essentially dependent upon the intelligent advancement of agriculture and the mechanic arts; and

*Whereas*, Congress, with wise forethought and regard for the future and permanent stability and welfare of the nation, did offer to the several States a liberal grant of public land for the promotion of this object, connecting with that offer only such conditions as are fitted to render more certain the accomplishment of its design; and

*Whereas*, The acceptance, by the Commonwealth, of the offer made by Congress has been officially signified to them, by His Excellency the Governor, and a corporation created by the legislature for the location, establishment and proper management of a college, "the leading object of which shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in order to promote the liberal and practical education of the industrial classes, in the several pursuits and professions of life;" and

*Whereas*, The present and prospective condition of the country renders the establishment of such an institution a matter of pre-eminent importance, and the convictions and wishes of large portions of the people are being made known, through prompt and generous proposals, by individuals and communities, of material aid for the speedy and effectual accomplishment of the the object in view;

*Therefore*, *Resolved*, That we, the State Board of Agriculture, prompted at once by our own convictions of the necessity of such an institution to the best interests of the State, and a just appreciation of the wisdom and sagacity of Congress in its gift for that object, and of the prompt and liberal proposals, by individuals and communities, for the purpose of insuring the accomplishment of it, do hereby express our cordial acknowledgments for the advantages, hitherto unattainable, which will thus be provided for large classes of our fellow-citizens; and our most earnest desire that, as speedily as consistent with necessary prudence and forecast, suitable measures may be adopted by those to whom the matter is entrusted, for the establishment and operation of an agricultural college in this Commonwealth.

*Resolved*, That, in order to facilitate the action of the corporation of the college, we respectfully suggest to the honorable Senate and House of Representatives, an amendment of the sixth section of the act incorporating the Massachusetts Agricultural College, so as to read that "the location, plan of organization, government and course of study prescribed for the college be subject to the approval of the governor and council," instead of "to the approval of the legislature."

*Resolved*, That the Secretary of the board be, and is hereby, authorized to enter these resolves upon his record of the doings of the board, and to transmit a copy of them to each of the several trustees of the college, and also to His Excellency, and the two branches of the legislature.

## PROFIT OF GROWING MEAT.

Mr. Stedman, from the committee on the profit and expediency of growing meat in this Commonwealth, submitted the

## REPORT:

The subject here presented seems to contain two distinct points, viz.: 1st, Is the production of meat as an article of food profitable to the farmers of Massachusetts, and 2d, whether in itself considered it yield a direct profit, or not, is it expedient to pursue it as a branch of husbandry, in connection with the advantages it affords in returning to the farm a large amount of the most valuable manure?

With regard to the question of profit, there exists much diversity of opinion; one individual claiming that the cost of producing a pound of meat of any kind is twice that of its selling price; while another is equally sure that between the cost of production and the market value, there exists a large margin as profit; and these conclusions, so widely different, may each be correct in particular cases, while, taken as a standard, neither is entitled to the least credit.

We do not now claim that the interests of Massachusetts farmers will be best promoted by engaging largely in the production of meat as a prime object. Yet, as a secondary, and, in connection with other branches, it is both profitable and expedient.

For example: In connection with the dairy, (which we admit should be a leading feature in Massachusetts husbandry,) the production of pork, or the raising of calves, to be sooner or later brought to the shambles, are indispensable requisites.

Which of the two will prove most profitable, must be decided by each individual, according to circumstances, though a blending of the two may be found most advantageous.

We might cite reported examples of the production of pork at enormous profits. But this is not our purpose. Neither have we sufficient data to give reliable estimates of the average cost of its production. As already intimated, its production should be mainly to consume the refuse of the dairy and the kitchen, and while doing this the growing swine should be liberally supplied with other, and comparatively valueless refuse to be found upon every farm, and which with proper attention they will convert into valuable manure, thus yielding a partial return for the grain required to fit them for slaughter.

The production of mutton in Massachusetts is largely on the increase from year to year, and, as we have reason to believe, with satisfactory results.

Upon a single farm in Hampshire County, one thousand wethers are being fattened at the present time, while from one hundred to three hundred is a very common flock for annual stall-feeding with farmers of the Connecticut Valley.

Comparatively few of those fattened, are bred within the State; most of them being purchased at the large market-places, or selected by the feeders, among the farmers of Vermont.

That they are thus purchased and fattened at a profit, there exists no doubt.

The question of breeds, and the relative importance of breeding for mutton, we pass over, hoping it may be duly considered in a future report.

We now pass to the production of beef. This we shall consider in three distinct classes.

And first is stall-feeding. This is mainly of oxen, and has been practiced to considerable extent for a long series of years, particularly in that section of the State known as the Connecticut Valley.

That this system of feeding has generally resulted in a *direct* profit to the feeder; in other words, that he has received in *cash*, the market value of hay and grain consumed; we do not for a moment claim.

If to the value of the beef, the market value of the manure be added, it is still doubtful whether the sum total would yield a full remuneration. Yet, with the exercise of good judgment in selection and purchase, and with skill and economy in feeding, together with due care in the preservation and application of manure, we arrive at the conclusion that this branch of meat producing is profitable.

At the same time we are sensible, that a neglect to bring into requisition some one or more of the above-named requisites, serves to reverse the whole operation and render it unprofitable, if not disastrous. While we speak thus cautiously upon this branch of our subject, it is fair and just to say that those farmers, who have been most persistent in this course of feeding, will at least compare favorably with others pecuniarily, while their farms are at present in a higher state of cultivation than those of their neighbors who have pursued a different and opposite policy.

The second grade or class of beef is produced mainly by grass, and from cows rejected from the dairy.

This branch has a wider range than the one already considered, being pursued to considerable extent in all the five western counties of the State.

That this a source of greater direct profit to the feeder than the former, admits of no doubt. From the most reliable authority, we feel it safe to say that an average advance of thirty-three per cent. upon the purchase may be relied upon in return for six months' pasturing, or from ten to fifteen dollars per head. When suitable stock can readily be procured, we believe that no better use can be made of a large portion of our good pasturage, and particularly, that portion lying too remote from the homestead to be conveniently appropriated to the use of the dairy.

In regard to the production of beef, by either method already noticed, it should be observed, that the animals fattened have previously passed from first hands; so that while they may yield a profit, and a large one, to the feeder, it is by no means certain that the breeder has not suffered a *loss*, equal to, or even greater than the profit of the feeder. Again, the cow or ox may, by its milk or its labor, have yielded a profit in first hands, while the feeder suffers loss. Yet we assume as a fact which we believe can be demonstrated, that with ordinary care, even under the present bad system, or rather want of system, in breeding, the production of beef in portions of Massachusetts is both profitable and expedient.

Upon a majority of the farms of Massachusetts, a portion of the labor can doubtless be most economically performed by oxen, and none will deny that in their breeding reference should be had to their ultimate fitness for the shambles. But with cows, and for the dairy, many claim, and with a show of reason, that the weight or quality of carcase is of no account.

There would be much truth in this statement, were we sure that each animal would prove entirely satisfactory for the purposes of the dairy, and could be *insured* against the many *ills* and accidents to which every dairyman finds them so much exposed.

When we take into account all these drawbacks, and especially the fact that of every three heifers raised, not more than two are at all suitable to be kept as dairy cows, it is of the utmost importance, that they possess those qualities which will enable the farmer to realize their cost for beef.

With a view to ascertain whether young stock can be raised in Massachusetts, for the purpose of beef, at a cost which will remunerate the farmer, we have solicited information from individuals in various parts of the State.

From the information thus obtained, the committee are fully convinced that with suitable care in *breeding*, and by *liberal* feeding, this branch of husbandry may be made a source of profit to the farmers in portions of the State, and is worthy to receive much more attention and skill than has hitherto been allowed.

We give below an estimate, from a farmer in Franklin County, of the cost of raising neat stock to an average age of three years, which we think a very fair one. The time of fattening is longer than is usually profitable, and if that were lessened by two, or even four weeks, the additional expense would be fully realized in an increase of the average weight.

His estimate is as follows :—

| | |
|---|---|
| Calf when dropped, | $1 00 |
| Expense of keeping, 52 weeks, at 22 cents, | 11 44 |
| Cost at one year old, | $12 44 |
| Pasturing 1 yearling 32 weeks, at $12\frac{1}{2}$ cents, | 4 00 |
| Wintering ditto 20 weeks, at 22 cents, | 4 50 |
| Interest on cost of first year, | 75 |
| Taxes, | 19 |
| Cost at two years old, | $21 88 |
| Pasturing 1 two-year old, 30 weeks, at $16\frac{3}{4}$ cents, | 5 00 |
| Interest on the same 8 months, 88 cents ; taxes, 33 cts., | 1 21 |
| Cost at two years and eight months, | $28 09 |

| | |
|---|---|
| The heifers should now be turned for beef, and will give an average dressed weight of 500 pounds, at $6 per hundred, | $30 00 |
| Deduct the cost, | 28 09 |
| Leaves a balance above cost of . | $1 91 |

| | |
|---|---|
| Pasturing 1 two-year old 32 weeks, at 20 cents, | $6 40 |
| Wintering ditto 20 weeks, at 33⅓ cents, | 6 67 |
| Interest on cost, $1.31; taxes, 33 cents, | 1 64 |
| Add cost at two years old, | 21 88 |
| Cost of steers at three years old, | $36 59 |
| Pasturing 1 three-year old 30 weeks, at 25 cents, | 7 50 |
| Interest on cost for 8 months, $1.46; taxes, 52 cents, | 1 98 |
| Cost of steers at three years and eight months, | $46 07 |

| | |
|---|---|
| Average weight per head, 750 pounds, at $6.50 per hundred, | $48 75 |
| Deduct cost, | 46 07 |
| Leaves a balance above cost, | $2 68 |

It may appear at first view that the above estimates are too low; but, upon careful consideration of the benefits of spending the produce upon the farm, and the increased advantage in this respect of the production of meat over that of milk, butter, or cheese, to be at once conveyed to the market, it may well be questioned whether the former is not really more remunerative, and should receive increased attention from the farmers of the Commonwealth.

In addition to the above estimates we may add that a farmer in Middlesex County is accustomed to take calves at one or two weeks old, and keep for the owner until two and one-half years old, for thirty dollars, and says it pays him well.

A farmer in Worcester County relates his own experience thus: "I purchase many calves to raise, but would sooner give away two, than raise one poor one.

"I once bought two steer calves for two dollars. When they were two years old they were put to work, and paid their keep the next two years, and were then sold for $130.

"Within the past nine years I raised and sold five pairs of four-year olds at an average of $115.60; and three pairs of three-year olds at an average of $80. I now have a pair three years old the present month, which girth six feet two inches.

"If a heifer does not give evidence of being a No. 1 cow, I fatten her the fall after her first coming in milk.

"Of five which came in last spring, four were right. The fifth, which was two years old in April, came in milk that month, but was not what I wished. She was milked till the last of September, was slaughtered the 22d of December, and her dressed weight was 600 pounds."

We might give other estimates, or add our own, but these vary so much, under different circumstances, that they will be deemed only approximate. And we feel justified in saying that if the foregoing estimates are low,—an increase of expenditure would afford a proportionate increased result.

We have already said that the raising of young stock for beef may be made a source of profit in portions of Massachusetts. An important advantage to be derived from this course is the ability to improve the dairy cows and working oxen, by retaining such only as give promise of approaching towards perfection in those departments.

We do not advise abandoning the dairy, or the production of beef to any considerable extent in the immediate vicinity of cities or manufacturing villages, where milk is in constant demand and at remunerative prices; yet we doubt the wisdom and economy of the course pursued by many, of sending to the cities large quantities of this valuable and indispensable article, at prices which appear equivalent to an extraction of *two* dollars from the soil to put *one* in the pocket. We would not be understood as wishing to enhance to the consumer the price of this, or any article of consumption above a fair remuneration; and, without elaborating upon the evil alluded to, simply suggest that when the price of any production falls below the cost of producing, added to the drain upon the soil, it should be at once abandoned.

In order to insure success in any branch of farming, the appliance of skill is an important requisite, and in none is it more so than in the one under consideration. Indeed, *skill* and *knowledge* are the key-notes, and requisite no less in breeding than in feeding. After the light and experience of the past, it seems hardly necessary to repeat what has been so clearly proved, that resort should be had to the best males of *improved* breeds, as the best and most economical means of improving our present stock. In addition to this, we feel safe in urging a more liberal system of feeding young stock. To this all agree in theory ; but is it so in *practice?* If any words of ours can induce in the mass of farmers a more liberal course in this respect, we shall rest assured of having contributed to increase the material wealth both of the farmers and the State. Stock intended solely for beef should be so fed as to be turned at an average age of three years at most ; the heifers at two and one-half, and steers at three and one-half, or usually in autumn, thus securing the advantage of more summer than winter feeding.

There is little danger of overstating the value of manure, and especially of that from fattening animals. Its economical value is increasing from year to year, selling readily at the present time, in portions of Massachusetts, at six to eight dollars per cord, and is doubtless worth to the tiller of the soil a much larger sum.

It has been claimed that in stall feeding, where a large portion of grain is fed, that the value of the manure is equal to that of the hay consumed, leaving only the price of grain to be realized from the sale of beef.

Is it not better economy to feed more sparingly of grain than has been the practice, taking more time, and relying largely upon hay and grass ?

We have thus imperfectly considered a subject which is of incalculable importance to the farmers of Massachusetts, and to which, more than to any other, we are to look for the recuperation and renovation of our somewhat exhausted and sterile soil,—a branch of husbandry to which large portions of the State are by nature well adapted.

We cannot better close this report than by borrowing the following language :

" It is highly necessary to repeat that this branch of husbandry is so important that it has employed the best agricultural skill for its development, and has enriched those who have pursued it with wisdom and judgment.

"The farmer has no aids and incentives to labor equal to his cattle—aids, as fellow-laborers and manufacturers of the best fertilizers for his lands—incentives, as indicating by their good condition, that the farm which they are at all times ready to serve, is well managed.

"It is, therefore, of the highest importance that they should not only be properly fed and protected, but that they should be selected with care and judgment.

"It is none but good animals that pay for keeping, and they pay for good keeping."

P. STEDMAN.
MOSES STEBBINS.
ABEL F. ADAMS.

## PREPARATION OF LANDS FOR CROPS.

Mr. Clement, from the Committee on the Preparation of Land for Crops, with special reference to Drainage, presented the following

## REPORT:

Persons who have been accustomed to visit district schools on examination days are never surprised to hear the multiplication table recited, even though it had been reiterated in their ears fifty times in the ten years next preceding the last visit. The same of other recitations, and for obvious reasons. Some are leaving and others entering the school-room for the first time at every term, rendering the same routine necessary from year to year.

Now, notwithstanding the discussions which have been carried on, both oral and written, in relation to the beneficial effects of *draining soils*, and the large number whose intelligence has been manifested in reducing their theories to practice, it is fair to presume that others are about entering the school of agriculture, and will have to learn what others have learned and practiced before. That fact alone must serve as an apology for writing what follows.

Of the advantages to be derived by draining bogs and swamps, I must ask permission to remark that what I have to write will in the main be a relation of my experience and that of some intelligent neighbors.

Colonel Enoch Marsh, of Pelham, N. H., having possession of a swamp of seven acres, on the south border of which was a sand-hill, it occurred to the mind of said Marsh that the swamp aforesaid could and ought to be reclaimed. Prior to my knowledge of the land, it had been covered with pine timber, and when the reclaiming operations commenced, stumps, hassocks, dwarf maples, birches, alders, blueberry bushes, dogwood and other pests entirely covered the surface. Ditches were dug round the piece, drawing the water some thirty inches below the surface ; brush cut and burned on the soil ; hassocks torn up and used for filling holes, or burned, as was most convenient. Large roots were cut off round the stumps, which latter were pried up, dragged off, and some hundred rods of valuable and durable fence made therewith. There being a scarcity of stone in the vicinity, the stumps came in very opportunely. Pine and other roots, all running on or near the surface, were cleared off with comparative ease, and good fuel enough procured to supply the family nearly five years. The surface having been "smoothed down," the base of the sandy hill all along the margin of the former "bog" was wheeled on, and carted on in winter when frozen so as to bear a team, in quantity sufficient to even the surface. The ashes from the materials burned served as a sweetener, thereby rendering the use of manure necessary only in small quantities.

With a biennial light dressing with compost, large crops of grass and hay are produced. Being aware that the *modus operandi* of draining and reclaiming soils, similar in character to that described, is pretty generally understood and somewhat extensively practiced, we desire to invite attention to a class of soils, which have been and are too much neglected. In the northern portion of Middlesex County are many tracts of land at an altitude far above our bogs and hollows, "high lands" they are frequently called, which are much too wet, and may be vastly improved by drains. Soils of that character usually present a growth of alders, hardhack, laurel, and frequently ferns or other herbage equally valueless. Rocks, too, generally abound. Another indication of tenacity is, where there are depressions in the soil, or slight basins, water will often remain on the surface for hours after a shower, showing that an almost impenetrable strata lies not far beneath the surface. Our own experience in the treatment of such cases is this: Run ditches through the hollows, two and a half to four feet deep, according to circumstances, put a culvert at the bottom with small stones found on the soil, filling the ditches to within sixteen to twenty inches of the surface with the same material, using the little chinkers freely, covering the same with coarse mulch or leaves before levelling up with earth.

We have sometimes found it necessary to cut drains through sections which were comparatively dry, in order to tap a basin, and have invariably witnessed improvement.

In one instance, we ditched round three acres of stiff, hard soil, three and a half feet wide, two to four feet deep as necessity required, laid a stone drain, and built a double wall thereon seven feet high, measuring from bottom of ditch. Through the lowest part of the same land cut another drain, stoned and covered with soil. Tapped the lower drain in two places, where the water is drawn off. The whole piece is sufficiently descending to let the water run freely and keep the drains from filling up.

This land is now covered with nursery stock and standard apple trees, the latter just coming into bearing, producing fruit which has drawn prizes. In digging drains, we find a pick indispensable. The "hard pan" we usually find from two to four feet below the surface, though not often so near as two feet. Men who love labor, and would lend a hand at making the "wilderness blossom like the rose," will find that several advantages are derived from operations of the kind just indicated. The ditches make a fine place for stowing away stones from the surface soil, or, when *fence* is desired, place the stones in, so as to answer that end. Frost will not throw down a wall properly laid on hard pan in such excavations.

The ditch banks may be used in filling up stone holes and other cavities, by which process results are effected, both in beauty of appearance and permanent improvement, which would astonish a novice in the business.

On the kind of soil of which we are writing, we have many times noticed, just before the snow, and while the ground is freezing, the rocks and boulders lying with the upper side partly above the surface, but still the bottom reaching below the frost, are not raised with the soil like the small stones, but remain in their bed, while the soil is thrown up, not unfrequently three or four inches from its former position, leaving the same amount of open space between the rock and lifted soil. That the action of frost is beneficial to the soil we do not entertain a doubt; yet, where there is such a superabundance of water as the "heaving" to such an extent indicates, the advantages to be derived from freezing under more favorable circumstances are lost, and in this way: when the frost is leaving the soil in spring, it settles down into so much water, that, after the surplus moisture has evaporated, and by slow process leached down, it is left too nearly in the condition of puddled earth.

We have sometimes, while walking on soil of this kind in spring, had it break under our feet to such an extent as to remind us of snow crust when not quite firm enough to sustain our weight. Such land is, to use common expression, natural to grass, as well as to coarser herbage, and, properly drained, will produce it in large quantities and much improved in quality. Many acres of our own soil is of this kind, some of which we have experimented upon; enough to convince us that more needs doing. One plot of three acres, in which are several knolls and side hills abundantly dry, but through the lower parts there are eighty rods of stoned-up, blind ditch, and there ought to be more.

Another, a swamp on our own premises, covering some five acres, at the head of which is a never-failing spring, the water from which passed along over the flat but uneven surface of the said five acres, and there being other springy places along the border, the soil was kept continually filled with water. Indeed, in the condition in which it *was*, we regarded it as a worthless lot; the growth upon the alders, with a sprinkling of dogwood, dwarf maples, blueberry, azalia, and other bushes, was perfectly valueless.

The surface soil, mud we should say, was from eight to twelve inches deep, below which, fine white sand with a slight mixture of clay, so closely settled together that it required much effort to enter it with a spade in many places; in others there was but a thin crust of hard substance, and then coarser sand. We desired to enlarge our pasture, and this wet piece being on one side of what was already grazing land, we determined to bring that in also. Commenced ditching at the causeway which crossed the lower end, digging along the east and west margins, about two-and-a-half feet deep, and up far enough to enclose about two acres, when we worked across, meeting in the middle. It was during a very dry time, and water troubled but little. Soon, however, it rained, filled the ditches with water, which, acting upon the sand, soon widened the same,—the sand finding its level,—filling the ditches to such an extent that we were obliged, after lowering the culvert at the causeway by which the water was drawn down two feet below the surface, to throw out the loose materials which had caved in, and stone up, leaving a passage for water the entire distance. Having the stones at hand, and wishing to get rid of them, we found an excellent place therefor.

As soon as it became sufficiently dry, fire was set to the rubbish, (the bushes having been previously cut,) and burned over nearly all the lot, but not deeply. The earth from the ditches was next distributed in the hollows, and the land left to itself. The second year thereafter the same was covered with grass, well sweetened with white clover. Subsequently, we have advanced the drains towards the fountain-head, stoning up as we proceed. As we progress, better quality of grass keeps apace also. Cattle graze upon that land daily all the season, cutting very close to the ground when there is a good run of feed on the upland. The presumption is, therefore, that sweet feed is produced. One advantage to be derived from having grazing land of the kind named is, water running in the bottom of ditches keeps the ground sufficiently moist by capillary attraction to sustain the crop in a perfectly fresh and green state, while the drought is so severe as to parch the drier lands and ruin the crop. Thus much in relation to stone drains upon side hills, on hard bottoms, and where, at short intervals of time, water runs in quantity, and with sufficient force to keep the culverts clear.

We desire now to call attention to a material extensively used in draining, and, according to facts gathered from intelligent gentlemen who have had sufficient experience in the business to enable them to judge with accuracy, a more safe, effectual and economical article than stones, in many places. We refer to drain tile, so called, of which we have noticed two kinds, the horse-shoe, and the sole tile, composed of clay, moulded and burned like bricks. From what we have observed and been enabled to learn from others, we confidently recommend the use of tile in the drainage of soils where the descent is so slight that the current of water must necessarily be sluggish—where field-mice will be troublesome—where the bottom or sides are of such nature as to render it difficult or impracticable to keep a stone drain clear. When level meadows are to be drained, as a general rule, the use of stones is out of the question. Tiles should be used for all but the main drain, which, in a majority of cases, should be left an open ditch. When, however, difficulty is experienced by washing, and the sides of main drain gushing in, it may be practicable to stone at the sides and leave uncovered.

In the use of tile, whatever kind is used, common sense will dictate that care and discretion must be exercised, by placing down in such a manner that they *cannot* be thrown out of place and the connection broken. From want of experience in the use of tile, our own draining operations having been carried on where the use of stones was feasible, we forbear giving directions in detail, in relation to the kind to be used, or the manner of using. The distance at which the drains should be laid from each other depends so much upon circumstances; the circumstances vary to such an extent in different localities, that we do not feel competent to give directions which would subserve the interests of practical men, in relation thereto.

If, from want of experience, or other cause, persons about to commence an enterprise of that kind, cannot rely upon their own judgment, or even if they think they can, we would advise a consultation with one or more individuals who possess experimental knowledge of the business.

We cannot close without urging attention to this subject by the farming community. While we are free to admit that many farmers appreciate the advantages to be derived from thorough draining, and practice in accordance therewith, we are sensible that a larger number do not evince, by their practice, any degree of interest in the matter. God has given the soil for man to till, to cultivate, to improve, much of which cannot be improved without first draining; and many stubborn facts can be adduced to show that that lies at the bottom of all intelligent practice.

For the Committee,

ASA CLEMENT.

A discussion arose as to the best method of reclaiming peat lands, and the materials most economical for the construction of drains, Messrs. Grout, Loring, Davis, Saltonstall, Stockbridge, and others participating. The report was accepted.

The delegates appointed to visit the county societies submitted reports upon the several exhibitions, all of which were accepted. These reports will be found on a subsequent page, to which reference is respectfully made.

The Preparation and Application of Manures was taken up for discussion.

Mr. Stedman stated that he had tried especially to guard against waste, and for this purpose he had constructed a barn-cellar. He makes a practice of mixing the manure of the horse and cow stables and the piggery, and keeps his fowls confined for the purpose of economizing the manure, giving them meat and oats occasionally. He had had the best results from the use of the compost made in the henery. The oats are given at the rate of four quarts a day for thirty fowls. Some recommend the use of sour milk in addition.

Mr. Saltonstall stated his mode of practice in the use of hard-coal ashes under the hen-roosts and in the piggery. He had found this material, after such use, to have a marked and extraordinary effect on fruit trees and evergreens to which he had applied it.

Mr. Stockbridge alluded to the extensive use of fish guano throughout the valley of the Connecticut, and the good results obtained on the crops.

Mr. E. W. Stebbins said it had generally failed in Deerfield.

Dr. Loring thought that manures should not be buried beyond the reach of atmospheric influences.

Mr. Clement did not believe it judicious for the farmer to have recourse to artificial manures where it could be avoided.

Dr. Hartwell recommended the sowing of buckwheat on light, poor soils, using guano, from which very good crops had been, and could generally be, obtained. He thought manures should be applied near the surface, and be well decomposed.

Mr. Grout, Mr. Bull, Mr. Lathrop, and others agreed with the propositions of Mr. Hartwell relative to keeping manures near the surface.

Mr. Saltonstall, from the Committee on the Application of Manures, presented the following

## REPORT:

The undersigned committee report that they have had submitted to them no returns of experiments with manures, made in accordance with the rules established by this Board, for premiums offered by the societies, except those which have been returned to the Trustees of the Massachusetts Society.

Through the courtesy of the president of that society, the Hon. George W. Lyman, your committee have been furnished, not only with those returns, but also with the able report of their committee, together with the tabular statements carefully arranged with the view of showing, in the most concise form, the results of those experiments.

It is deemed inexpedient by your committee to attempt to re-arrange these returns, and they are, therefore, presented as tabulated by the able committee of the Massachusetts Society, together with the report to that society on the experiments of the first series, which has been kindly presented to the Board for publication.

Leverett Saltonstall,
Charles G. Davis,
John B. Moore,
*Committee.*

Boston, February 3, 1864.

## REPORT

*On the First Series of Experiments for the years* 1860, 1861, *and* 1862.

The Trustees of the Massachusetts Society for Promoting Agriculture having received the reports of the competitors for premiums on the tilling and manuring of land for the years 1860, '61, and '62, have carefully examined them, and prepared a tabular statement of them.

The reported products of the five lots for each of the three years are herewith presented in the tabular form in pounds weight. Crops reported in bushels have been reduced to pounds, according to the usual weight of the bushel of such crops, when not so reported in pounds by the competitor.

Table numbered 1 shows the product in pounds from each of the 5 lots and for each year.

Table numbered 2 shows the aggregate pounds of crop from the 5 different lots and for each year.

Table numbered 3 shows the details of each competitor's report.

In these tables the weight of corn stover, and of straw from grain, has been omitted as not essentially necessary for the purposes of these tables.

It appears by the reports in the tables, that the experiments have been carefully made, and that the said reports, as inserted, are equally entitled to a place in the tables. The competitors, by their action and reports, have conferred a great favor, and it may be also a benefit to themselves individually, as well as to all farmers interested in any improved mode of tilling and manuring land.

The report from Mr. Woodward has been omitted, for the reason that his crop, in 1860, was destroyed by worms.

The report from the Treadwell farm is omitted, no return for 1860 being made.

The report of Mr. Belden, of Whately, is in the tables. The crops of 1860 and 1861 were tobacco, and the crop of 1862 was wheat. But Mr. Belden having manured his land in the second year (1861) as he did in 1860, (the manure both years being 313 lbs. of Peruvian guano on each plot,) he is thereby excluded as a competitor for premium under the rules. Inasmuch, however, as his practice in the experiment may be interesting, it has been inserted in the tables.

Attention is called to Mr. Wyman's and Mr. Ware's reports, each cultivating in their own way an additional lot, and which lot is numbered 6 in table No. 1. The lots thus numbered 6 are reported as of the same size and quality as their respective lots Nos. 1 to 5; but the pounds of crop on these No. 6 lots are not carried to tables 2 and 3.

Mr. Wyman reports that he used on this lot 6 the same quantity of manure as on his other lots. He divided the manure for this lot 6 into three equal parts—one-third he put on the sward before ploughing, one-third on the furrow after the first ploughing, and one-third on the furrow after the second ploughing, and then harrowed the lands for planting. No manure was put in 1861 and 1862 on his lot No. 6.

Mr. Ware reports that he applied the first year on his lot No. 6 about the same quantity of manure as on the other lots, 1 and 4, and manured the said lot No. 6, 1861 and 1862, at the rate of about nine cords per acre for each of those years.

Premiums have been awarded and paid to John Partridge, Levi Stockbridge, and W. G. Wyman.

George W. Lyman,
Thomas Motley, Jr.,
*Committee.*

Boston, April 10, 1863.

Table No. 1.

| | Number. | 1st Year. Pounds. | 2d Year. Pounds. | 3d Year. Pounds. | Total. Pounds. |
|---|---|---|---|---|---|
| Levi Stockbridge, 1½ acres, | 1 | 720 | 273½ | 825 | 1,818½ |
| First year, Corn. | 2 | 615 | 273⅓ | 694 | 1,582 |
| Second year, Wheat. | 3 | 607 | 273⅓ | 643 | 1,523 |
| Third year, Hay. | 4 | 508 | 291¼ | 544 | 1,343¼ |
| | 5 | 422 | 216 1-7 | 487 | 1,125 |
| Spencer Leonard, 60 square rods, | 1 | 382¾ | 46½ | 150 | 579¼ |
| First year, Corn. | 2 | 407 | 53 | 175 | 635 |
| Second year, Barley. | 3 | 321¾ | 49 | 167 | 537¾ |
| Third year, Hay. | 4 | 321½ | 47 | 175 | 543½ |
| | 5 | 234½ | 29½ | 88 | 352 |
| Joseph White, 1 acre, | 1 | 676 | 466 | 1,170 | 2,312 |
| First year, Corn. | 2 | 754 | 484 | 1,205 | 2,443 |
| Second year, Barley. | 3 | 772 | 464 | 1,100 | 2,336 |
| Third year, Hay. | 4 | 525 | 392 | 1,070 | 1,987 |
| | 5 | 380 | 340 | 980 | 1,700 |
| W. G. Wyman, 1 acre, 32 rods, | 1 | 890 | 203 | 4.572 | 5,665 |
| First year, Corn. | 2 | 811 | 170 | 4,852 | 5,833 |
| Second year, Wheat. | 3 | 873 | 192 | 4,426 | 5,491 |
| Third year, Green Grass. | 4 | 840 | 183 | 3,732 | 4,755 |
| | 5 | 403 | 62 | 1,170 | 1,635 |
| | 6 | 859 | 163 | 4,938 | 5,960 |

### TABLE NO. 1—*Continued.*

| | Number. | 1st Year. Pounds. | 2d Year. Pounds. | 3d Year. Pounds. | Total. Pounds. |
|---|---|---|---|---|---|
| Albert Stratton, 45 rods,<br>First year, Corn.<br>Second year, Oats.<br>Third year, Green Grass. | 1 | 125 | 54 | 288 | 467 |
| | 2 | 200 | 52 | 269 | 521 |
| | 3 | 203 | 50 | 336 | 589 |
| | 4 | 155 | 52½ | 345 | 552½ |
| | 5 | 60 | 44 | 258 | 362 |
| C. C. Perkins, 75 rods,<br>First year, Corn.<br>Second year, Barley.<br>Third year, Green Grass. | 1 | 181 | 80½ | 416 | 697½ |
| | 2 | 220 | 97 | 441 | 758 |
| | 3 | 234 | 102 | 499 | 835 |
| | 4 | 269 | 99 | 479 | 847 |
| | 5 | 165 | 74 | 388 | 627 |
| John Partridge, 2½ acres,<br>First year, Corn.<br>Second year, Oats.<br>Third year, Green Grass. | 1 | 241 | 254 | 262 | 757 |
| | 2 | 313 | 239 | 273 | 825 |
| | 3 | 385 | 277 | 298 | 960 |
| | 4 | 268 | 252 | 280 | 800 |
| | 5 | 215 | 199 | 104 | 518 |
| L. W. Curtis, 1 acre,<br>First year, Corn.<br>Second year, Barley.<br>Third year, Green Grass. | 1 | 846 | 344 | 736 | 1,926 |
| | 2 | 982 | 408 | 768 | 2,158 |
| | 3 | 1,022 | 496 | 832 | 2,350 |
| | 4 | 912 | 508 | 800 | 2,220 |
| | 5 | 487 | 208 | 384 | 1,079 |
| Justus Tower, 1 acre,<br>First year, Corn.<br>Second year, Oats.<br>Third year, Green Grass. | 1 | 858 | 418½ | 646 | 1,922½ |
| | 2 | 951 | 387½ | 725 | 2,063½ |
| | 3 | 909 | 330 | 590 | 1,829 |
| | 4 | 759 | 304½ | 510 | 1,573½ |
| | 5 | 672 | 247 | 320 | 1,239 |
| B. P. Ware, 60 rods,<br>First year, Potatoes.<br>Second year, Mangold.<br>Third year, Carrots. | 1 | 992 | 3,170 | 2,715 | 6,877 |
| | 2 | 1,144 | 3,160 | 2,660 | 6,964 |
| | 3 | 940 | 3,200 | 2,950 | 7,090 |
| | 4 | 1,047 | 2,810 | 2,690 | 6,547 |
| | 5 | 795 | 2,510 | 2,755 | 5,660 |
| | 6 | 895 | 4,500 | 3,220 | 8,615 |
| E. Belden,* 1 acre,<br>First year, Tobacco.<br>Second year, Tobacco.<br>Third year, Wheat. | 1 | 340 | 336 | 315 | 991 |
| | 2 | 432 | 343 | 255 | 1,030 |
| | 3 | 401 | 351 | 247 | 999 |
| | 4 | 401 | 337 | 192 | 930 |
| | 5 | 255 | 125 | 190 | 570 |
| I. B. V. Coburn, 1¼ acres,<br>First year, Corn.<br>Second year, Wheat.<br>Third year, Wheat. | 1 | 700 | 273 | 61 | 1,034 |
| | 2 | 1,162 | 308 | 64 | 1,534 |
| | 3 | 1,176 | 280 | 51 | 1,507 |
| | 4 | 1,036 | 336 | 60 | 1,432 |
| | 5 | 266 | 140 | 15 | 421 |

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* Ploughed and manured second year.

### Table No. 2.

| | Lot No. 1. | Lot No. 2. | Lot No. 3. | Lot No. 4. | Lot No. 5. |
|---|---|---|---|---|---|
| First year, | 720 | 615 | 607 | 508 | 422 |
| | 382¾ | 407 | 321¾ | 321½ | 234½ |
| | 676 | 754 | 772 | 525 | 380 |
| | 890 | 811 | 873 | 840 | 403 |
| | 125 | 200 | 203 | 155 | 60 |
| | 181 | 220 | 234 | 269 | 165 |
| | 241 | 313 | 385 | 268 | 215 |
| | 846 | 982 | 1,022 | 912 | 487 |
| | 858 | 951 | 909 | 759 | 672 |
| | 992 | 1,144 | 940 | 1,047 | 795 |
| | 340 | 432 | 401 | 401 | 255 |
| | 700 | 1,162 | 1,176 | 1,036 | 266 |
| Second year, | 273½ | 273⅓ | 273⅓ | 291¼ | 216⅐ |
| | 46½ | 53 | 49 | 47 | 29½ |
| | 466 | 484 | 464 | 392 | 340 |
| | 203 | 170 | 192 | 183 | 62 |
| | 54 | 52 | 50 | 52½ | 44 |
| | 80½ | 97 | 102 | 99 | 74 |
| | 254 | 239 | 277 | 252 | 199 |
| | 344 | 408 | 496 | 508 | 208 |
| | 418½ | 387½ | 330 | 304½ | 247 |
| | 3,170 | 3,160 | 3,200 | 2,810 | 2,110 |
| | 336 | 343 | 351 | 337 | 125 |
| | 273 | 308 | 280 | 336 | 140 |
| Third year, | 825 | 694 | 643 | 544 | 487 |
| | 150 | 175 | 167 | 175 | 88 |
| | 1,170 | 1,205 | 1,100 | 1,070 | 980 |
| | 4,572 | 4,852 | 4,426 | 3,732 | 1,170 |
| | 288 | 269 | 336 | 345 | 258 |
| | 416 | 441 | 499 | 479 | 388 |
| | 262 | 273 | 298 | 280 | 104 |
| | 736 | 768 | 832 | 800 | 384 |
| | 646 | 725 | 590 | 510 | 320 |
| | 2,715 | 2,660 | 2,950 | 2,690 | 2,755 |
| | 315 | 255 | 247 | 192 | 190 |
| | 61 | 64 | 51 | 60 | 15 |
| Totals, | 25,026¾ | 26,346 | 26,047 | 23,530¾ | 15,288⅐ |

## TABLE NO. 3.

*Tabular Statement of Experiments with Manures during the Years* 1860, 1861 *and* 1862, *for the Premiums of the Massachusetts Society for Promoting Agriculture.*

| Name of Competitor. | Land. | Soil. | 1859. | First Ploughing. Inches. | Second Ploughing. Inches. | 1860. Weather. | 1861. Weather. | 1862. Weather. | Lot No. 1. Aggregate. lbs. | Lot No. 2. Aggregate. lbs. | Lot No. 3. Aggregate. lbs. | Lot No. 4. Aggregate. lbs. | Lot No. 5. Aggregate. lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Levi Stockbridge, . . | 1½ acres, . | Light loam, . | Hay, . . | 8 | 4 | Moist, . | Average, | Moist, . | 1,818½ | 1,582 | 1,523 | 1,343¼ | 1,125 |
| Spencer Leonard, . . | 60 sq. rods, . | Rather light, . | Grass, . | 7 | 4 | Dry, . | Average, | Dry, . | 579¼ | 635 | 537¾ | 543½ | 352 |
| Joseph White, . . . | 1 acre, . . | Heavy, moist loam, | Corn, . . | 8 | 4 | Wet, . | Moist, . | Moist, . | 2,312 | 2,443 | 2,336 | 1,987 | 1,700 |
| W. G. Wyman, . . | 1 acre 32 rods, | Heavy loam, . | Hay, . . | 8 | 4 | Wet, . | Rather dry, | Dry, . | 5,665 | 5,833 | 5,491 | 4,755 | 1,635 |
| Albert Stratton, . . | 45 rods, . . | Rather heavy, | Grass, . . | 7 to 8 | – | Moist, . | No mention, | Moist, . | 467 | 521 | 589 | 552½ | 362 |
| C. C. Perkins, . . . | 75 rods, . . | Yellow loam, . | Corn, . . | 9 | 5 | Moist and cold, | Average, | Average, | 697½ | 758 | 835 | 847 | 627 |
| John Partridge, . . | 2½ acres, . | Sandy gravelly loam, | Old pasture, | 7 | – | Average, | Moist, . | – | 757 | 825 | 960 | 800 | 518 |
| L. W. Curtis, . . . | 1 acre, . . | Loamy yellow subsoil, | Brok. up fall of '59, . | 8 | 4 | – | Moist, . | Dry, . | 1,926 | 2,158 | 2,350 | 2,220 | 1,079 |
| Justus Tower, . . . | 1 acre, . . | Clay loam, . | Potatoes and Corn, . | 8 | 4 | Wet, . | Dry, . | Moist, . | 1,922½ | 2,063½ | 1,829 | 1,573½ | 1,239 |
| B. P. Ware, . . . | 60 rods, . . | Deep d'rk loam, | Grass, . . | 8 | 4 | Moist, . | Rather moist, | Moist, . | 6,877 | 6,964 | 7,090 | 6,547 | 5,660 |
| I. B. V. Coburn, . . | 1¼ acres, . | Fine loam, intervale land, | Grass, . . | 8 | 4 | Moist, . | Moist, . | Moist, . | 1,034 | 1,534 | 1,507 | 1,432 | 421 |
| E. Belden, . . . | 1 acre, . . | – – | Tobacco, . | 12 | – | – | Moist, . | Moist, . | 991 | 1,030 | 999 | 930 | 570 |
| Totals, . . . | . . . | . . . . | . . . . | . | . | . . | . . | . | 25,026¾ | 26,346 | 26,047 | 23,530¾ | 15,288 |

## SECOND SERIES OF EXPERIMENTS FOR THE YEARS 1861, '62 AND '63.

*To the Trustees of the Massachusetts Society for Promoting Agriculture.*

The undersigned committee have examined the reports of the competitors for the premiums for experiments in manuring and cultivating land for crops for the years 1861, 1862, and 1863. There are eight reports; last year the number of them was twelve. The rules and directions appear to have been complied with, and with care and accuracy. Two or three small deviations will be noticed below.

Tabular statements are presented herewith.

The reports contain remarks and opinions relating to the seasons as they affected the growing crops. These are too extended to be inserted in this report, and besides, they do not affect, necessarily, the purpose of the experiments, which is believed to be to ascertain how to manure and cultivate land in order to get from it the largest number of pounds of crop.

The quantities and values of manures used, and the soils, more or less fertile, or made so by previous manuring and cultivation, may differ very much; but, nevertheless, the figures in the tables showing the detailed pounds of crop in each lot, and the figures showing the aggregate pounds of crops on all the lots, serve equally well to obtain simple and plain answers to the inquiries made by the State Board, which were by these experiments to ascertain the best mode of using manure on land.

Mr. Lincoln reports on two lots of twenty square rods each, differing very much in the quality of soil and subsoil.

The report of the Essex Society Farm states that rye and grass seeds were sown on the corn in 1861, that they grew well, and were ploughed under in 1862 for the crop of barley and seeds for that year, which excludes it as a competitor for premium.

Mr. Weld reports the product on a sixth lot which received extra manuring. This lot six is in table No. 1, but is not included in tables Nos. 2 and 3. His hay crop on lots 4 and 5 was increased in weight by much sorrel.

Mr. Breck reports the results for the two years, 1861 and 1862, of the use of super-phosphates and wood ashes, on lots adjoining his lots 1 to 5, at the rate of eight hundred pounds of phosphate and eighty bushels wood ashes per acre. It appears that his crop of corn so manured was much less, and that his rye in 1862 was rather less than on the manured lots 1 to 5.

Mr. Breck also gives his method of estimating the increased value of crop by the use of manure, which is in taking the value of the three years' crops on lot No. 5, and comparing this sum with the values of the crops of the other four lots, respectively, after deducting the value of the manure used. This computation may be easily made by any person from the figures in the tables.

Mr. Benson makes a similar statement.

An incomplete report is on file from Mr. E. W. Gardner of Nantucket.

It may be noticed that the weight of corn stover, and that of the straw of other grain is included in the tables. In our report of last year it was omitted, not being considered as necessarily affecting the ends of the inquiries. The aggregate weights are this year in the tables increased thereby—that is by the weight of the stover and straw.

GEO. W. LYMAN,
THOS. MOTLEY, Jr.

BOSTON, February 1, 1864.

NOTE.—The premiums of one hundred dollars each were awarded to Mr. Breck, Mr. Benson, and Mr. Lincoln.

## TABLE NO. 4.

| | Number. | First Year. Pounds. | | Second Year. Pounds. | | 3d Year. lbs. | Total. lbs. |
|---|---|---|---|---|---|---|---|
| F. W. Lincoln, 1st plot, 20 sq. rods,<br>1st year, Corn & Cob, Stover.<br>2d year, Oats, Straw.<br>3d year, Hay. | 1 | 101 | 87 | 5¾ | 66 | 82½ | 342¼ |
| | 2 | 83 | 67 | 7¾ | 43 | 56 | 256¾ |
| | 3 | 99 | 81 | 5½ | 56 | 99½ | 341 |
| | 4 | 96 | 83 | 6 | 68 | 99¼ | 352¼ |
| | 5 | 57¼ | 49 | 3½ | 28 | 68¼ | 206 |
| F. W. Lincoln, 2d plot, 20 sq. rods,<br>1st year, Corn & Cob, Stover.<br>2d year, Oats, Straw.<br>3d year, Hay. | 1 | 112 | 131 | 17¼ | 85 | 156 | 501¼ |
| | 2 | 110 | 105 | 14¾ | 88 | 146¼ | 464 |
| | 3 | 116 | 116 | 14 | 90 | 171¾ | 507¾ |
| | 4 | 115 | 134 | 16½ | 110¼ | 147 | 522¾ |
| | 5 | 85 | 105 | 12 | 58½ | 96¾ | 357¼ |
| Essex County Farm, 2½ acres,<br>1st year, Corn, Stover.<br>2d year, Barley, Straw.<br>3d year, Hay. | 1 | 3,164 | 2,950 | 784 | 780 | 925 | 8,603 |
| | 2 | 2,800 | 2,270 | 756 | 810 | 747 | 7,383 |
| | 3 | 2.408 | 1,330 | 728 | 828 | 408 | 5,702 |
| | 4 | 2,100 | 1,270 | 728 | 905 | 370 | 5,373 |
| | 5 | 840 | 500 | 112 | 375 | 30 | 1,857 |
| Spencer Leonard, 60 sq. rods,<br>1st year, Corn & Cob, Stover.<br>2d year, Rye, Straw.<br>3d year, Hay. | 1 | 358 | 274 | 107 | 180 | 395 | 1,314 |
| | 2 | 343 | 253 | 90½ | 145 | 420 | 1,251½ |
| | 3 | 351 | 249 | 89 | 140¾ | 384 | 1,213¾ |
| | 4 | 319 | 230 | 96¾ | 173¾ | 363 | 1,182½ |
| | 5 | 255 | 203 | 63¾ | 126¾ | 102 | 750½ |
| A. P. Benson, 1 acre,<br>1st year, Corn and Potatoes, Stover.<br>2d year, Oats, Straw.<br>3d year, Hay. | 1 | 1,284 | 700 | 163 | 229 | 556 | 2,932 |
| | 2 | 1,213 | 689 | 167 | 230 | 729 | 3,028 |
| | 3 | 1,215 | 579 | 168 | 230 | 745 | 2.937 |
| | 4 | 1,017 | 446 | 150 | 228 | 487 | 2,328 |
| | 5 | 883 | 426 | 125 | 220 | 251 | 1,905 |
| C. C. Perkins, 30 rods,<br>1st year, Corn and Potatoes, Stover.<br>2d year, Oats, Straw.<br>3d year, Hay. | 1 | 56½ | 58½ | 30¼ | 58 | 131½ | 334¾ |
| | 2 | 88 | 78 | 34½ | 84 | 153½ | 438 |
| | 3 | 87¾ | 87 | 34¾ | 78 | 164¾ | 452¼ |
| | 4 | 86½ | 96 | 33¼ | 64 | 152½ | 432¼ |
| | 5 | 55 | 55½ | 27¾ | 59 | 116 | 313¼ |
| B. P. Ware, 40,000 sq. feet,<br>1st year, Corn, Stover.<br>2d year, Spring Wheat, Straw.<br>3d year, Hay. | 1 | 1,079 | 1,871 | 302 | 443 | 805 | 4,500 |
| | 2 | 1,058 | 1,622 | 273 | 392 | 625 | 3,970 |
| | 3 | 937 | 1,173 | 268 | 417 | 640 | 3,435 |
| | 4 | 874 | 1,096 | 269 | 371 | 615 | 3,225 |
| | 5 | 773 | 917 | 246 | 424 | 740 | 3,100 |
| A. D. Weld, 120 square rods,<br>1st year, Corn, Stover.<br>2d year, Rye, Straw.<br>3d year, Hay. | 1 | 230 | 635 | 195 | 445 | 225 | 1,730 |
| | 2 | 274 | 731 | 251 | 519 | 270 | 2,045 |
| | 3 | 253 | 642 | 247 | 493 | 265 | 1,900 |
| | 4 | 200 | 596 | 250 | 480 | 280 | 1,806 |
| | 5 | 167 | 413 | 198 | 422 | 240 | 1,440 |
| | 6 | 254 | 586 | 360 | 760 | 570 | 2,530 |
| Charles Buck, 20 rods,<br>1st year, Corn, Stover.<br>2d year, Rye, Straw.<br>3d year, Hay. | 1 | 116 | 118 | 38½ | 70 | 37 | 379½ |
| | 2 | 128 | 103 | 37 | 72 | 42 | 382 |
| | 3 | 118 | 79 | 29½ | 51 | 28 | 305½ |
| | 4 | 56 | 42 | 28 | 47½ | 20 | 193½ |
| | 5 | 23 | 25 | 9 | 21½ | 8½ | 87 |

## TABLE NO. 5.

| | Lot No. 1. | Lot No. 2. | Lot No. 3. | Lot No. 4. | Lot No. 5. |
|---|---|---|---|---|---|
| First year, | 188 | 150 | 180 | 179 | 106¼ |
| | 243 | 215 | 232 | 249 | 190 |
| | 6,114 | 5,070 | 3,738 | 3,370 | 1,340 |
| | 632 | 596 | 600 | 549 | 458 |
| | 1,984 | 1,902 | 1,794 | 1,463 | 1,309 |
| | 115 | 166 | 174¾ | 182½ | 110½ |
| | 2,950 | 2,680 | 2,110 | 1,970 | 1,690 |
| | 865 | 1,005 | 895 | 796 | 580 |
| | 234 | 231 | 197 | 98 | 48 |
| Second year, | 71¾ | 50¾ | 61½ | 74 | 31½ |
| | 102¼ | 102¾ | 104 | 126¾ | 70½ |
| | 1,564 | 1,566 | 1,556 | 1,633 | 487 |
| | 287 | 235½ | 229¾ | 270½ | 190½ |
| | 392 | 397 | 398 | 378 | 345 |
| | 88¼ | 118½ | 112¾ | 97¼ | 86¾ |
| | 745 | 665 | 685 | 640 | 670 |
| | 640 | 770 | 740 | 730 | 620 |
| | 108½ | 109 | 80½ | 75½ | 30½ |
| Third year, | 82½ | 56 | 99½ | 99¼ | 68¼ |
| | 156 | 146¼ | 171¾ | 147 | 96¾ |
| | 925 | 747 | 408 | 370 | 30 |
| | 395 | 420 | 384 | 363 | 102 |
| | 556 | 729 | 745 | 487 | 251 |
| | 131½ | 153½ | 164¾ | 152½ | 116 |
| | 805 | 625 | 640 | 615 | 740 |
| | 225 | 270 | 265 | 280 | 240 |
| | 37 | 42 | 28 | 20 | 8½ |
| Total, | 20,636¾ | 19,218¼ | 16,794¼ | 15,415¼ | 10,016 |

## TABLE NO. 6.

*Tabular Statement of Experiments with Manures during the Years 1861, 1862 and 1863, for the Premiums of the Massachusetts Society for Promoting Agriculture.*

| Name of Competitor. | Quantity of Land. | Character of Soil. | State of Land. **1860.** | First Ploughing. Inches. | Second Ploughing. Inches. | **1861.** Weather. | **1862.** Weather. | **1863.** Weather. | Lot No. 1. Aggregate. lbs. | Lot No. 2. Aggregate. lbs. | Lot No. 3. Aggregate. lbs. | Lot No. 4. Aggregate. lbs. | Lot No. 5. Aggregate. lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F. W. Lincoln, . | 20 sq. rods, . | Sandy loam, | Grass, . . | 7 | 4 | Moist, . | Moist, . | Wet, . | 342¼ | 256¾ | 341 | 352¼ | 206 |
| F. W. Lincoln, . | 20 sq. rods, . | Heavy loam on clay, | Meadows for 25 years, | 7 | 4 | Moist, . | Moist, . | Wet, . | 501¼ | 464 | 507¾ | 522¾ | 357¼ |
| Essex County Farm, | 2¼ acres, . . | Light sandy loam, | Grass, . . | 8 | 4 | Inches rain 12.360, | No report, | Inches rain 25.242, | 8,603 | 7,383 | 5,702 | 5,373 | 1,857 |
| Spencer Leonard, . | 60 sq. rods, . | Light sandy loam, | Grass, . . | 7 | 4 | Moist, . | Dry, . | Moist, . | 1,314 | 1,251½ | 1,213¾ | 1,182½ | 750½ |
| A. P. Benson, . . | 1 acre, . . | Dark loam, | Pasture for 25 years, | 9 | 4 | Moist, . | Dry, . | Dry, . | 2,932 | 3,028 | 2,937 | 2,328 | 1,905 |
| C. C. Perkins, . . | 30 rods, . . | Sandy loam, | Corn, . . | 8 | 4 | Wet, . | Moist, . | Moist, . | 334¾ | 438 | 452¼ | 432½ | 313¼ |
| B. P. Ware, . . | 40,000 sq. feet, | Dark loam, | Onions 6 years previously, | 8 | 4 | Moist, . | Moist, . | Moist, . | 4,500 | 3,970 | 3,435 | 3,225 | 3,100 |
| A. D. Weld, . . | 120 sq. rods, . | Heavy l'm, | Grass 7 years, . | 8 | 4 | Dry, . | Moist, . | Moist, . | 1,730 | 2,045 | 1,900 | 1,806 | 1,440 |
| Charles Breck, . | 20 rods, . . | Light loam, old pasture, | Old pasture, . | 7½ | 4 | Dry, . | Moist, . | Moist, . | 379½ | 382 | 305½ | 193½ | 87 |
| Totals, . . | . . . | . . . | . . . | . | . | . . | . . | . . | 20,636¾ | 19,218¼ | 16,794¼ | 15,415¼ | 10,016 |

Mr. Stockbridge, from the Committe on the Library, submitted the following

## REPORT:

Through the influence of the Secretary of this Board, an appropriation of two thousand dollars was made ten years ago by the legislature, for the purpose of establishing an agricultural library, and collecting models of fruits, chiefly for the use of this office. That appropriation was soon expended by him for the object designed, since which time all additions to the library have been made by exchanges and donations. It now contains nine hundred and thirty-two volumes, three hundred and fifty-two having been added since the last catalogue was printed. Although great care has been exercised, and the most judicious selections have been made, until we have one of the best agricultural libraries in the country, yet, it is altogether too meagre, and not up to the times, or in keeping with the important business of this office and the board. More books are needed on the various topics of natural history, and sheep-husbandry. A new catalogue should be prepared and printed. New cases should be provided, or the old ones repaired and provided with glass doors for the better preservation of the books. For these purposes, an appropriation by the legislature is much needed, but owing to the great pressure on the State treasury to pay the expenses incident to the war, your committee would not recommend one at this time, but would suggest earnest effort by the Secretary and the members of the board, to procure by donation from individuals and associations, in various parts of the Commonwealth, or abroad, such books as may be needed, and would be useful to the cause of agriculture, if placed in the library. There have never been any fixed rules or regulations for taking books from the library, though occasionally the members of the board are accustomed to carry them to their homes for a limited time, and they are freely used at the office by the members of the legislature. We would recommend that the Secretary of the board be requested to establish rules to prevent the loss of books and injury to the office business, and allow them to be drawn at will under those rules, by the members of this board.

We would also recommend that the system of exchanges established last year, be continued, and, if possible, made more extensive. For the committee,

LEVI STOCKBRIDGE, *Chairman.*

On motion of Mr. Lathrop, the proposition of the Hampshire, Franklin and Hampden Society, offering the use of their grounds to the Board, for the purposes of a State fair, was taken up for consideration.

A motion having been made to hold a State fair there in 1863, was, after discussion, withdrawn.

The delegates to attend the exhibition of the County Agricultural Societies, were assigned, as follows: To the

| | |
|---|---|
| Essex, | LEVERETT SALTONSTALL. |
| Middlesex, | CHARLES C. SEWALL. |
| Middlesex North, | HARRISON GARFIELD. |
| Middlesex South, | CHARLES O. PERKINS. |
| Worcester, | DANIEL A. CLEAVELAND. |
| Worcester West, | JOHN B. MOORE. |
| Worcester North, | PHINEAS STEDMAN. |
| Worcester South, | ASA CLEMENT. |
| Worcester South-East, | ALURED HOMER. |
| Hampshire, Franklin and Hampden, | GEORGE B. LORING. |
| Highland, | EDWARD W. STEBBINS. |
| Hampshire, | CHARLES G. DAVIS. |
| Hampden, | ELIAS GROUT. |
| Hampden East, | LEVI STOCKBRIDGE. |
| Franklin, | MATTHEW SMITH. |
| Berkshire, | GEORGE B. LORING. |
| Hoosac Valley, | ABEL F. ADAMS. |
| Housatonic, | T. G. HUNTINGTON. |
| Norfolk, | SAMUEL HARTWELL. |
| Bristol, | HOLLIS TIDD. |
| Plymouth, | PERRY WOOD. |
| Barnstable, | SYLVANDER JOHNSON. |
| Nantucket, | PAOLI LATHROP. |
| Martha's Vineyard, | HENRY R. KEITH. |

Mr. Stedman, from a committee on Subjects and a Plan of operations for the year, submitted a list of subjects for investigation, on which committees were appointed as follows:

1st. On the comparative value of different kinds of Food for different classes of Stock, and the most economical mode of preparing it—Messrs. Loring, Lathrop, Perkins, and Homer.

2d. Farm Buildings—Messrs. Perkins, Loring, and Thompson.

3d. Cranberries—Messrs. Wood, Cleaveland, and Thompson.

4th. On the Grass Crop, its composition, value, and profit—Messrs. Stebbins, Stockbridge, and Wood.

5th. On the Management of Forest Trees—Messrs. Phinney, Thompson, and Davis.

6th. On the Cultivation and Use of Flax—Messrs. Sewall, Hartwell, and Lathrop.

7th. On Grape Culture—Messrs. Bull, Clement, and Moore.

8th. On the Dairy—cost and comparative profits of Milk, Butter, and Cheese—Messrs. Keith, Huntington, and Tidd.

9th. On Fruit Culture—Messrs. Moore, Clement, and Bull.

10th. On Garden Vegetables and Root Crops—Messrs. Huntington, Stedman, and Smith.

11th. On Farm Fences—Messrs. Grout, Adams, and Johnson.

12th. On Farm Accounts—Messrs. Garfield, Stebbins, and Stedman.

13th. On the Preparation and Application of Manures—Messrs. Saltonstall, Stedman, and Stockbridge.

The Standing Committees were constituted as follows:

*On Finance*—Messrs. Loring, Stedman, and Lathrop.

*Museum and Library*—Messrs. Stockbridge, Stedman, and Bull.

*Meetings*—Messrs. Loring, Bull, and Stebbins.

*Reports*—Messrs. Phinney, Lathrop, and Stockbridge.

*Cattle Disease*—Messrs. Stedman, Lathrop, and Smith.

Mr. Stedman, from the committee appointed for the purpose, submitted a report, which was adopted, as follows:

### ON MEETINGS.

It is recommended that a meeting for business, lectures, and discussion, be held at Greenfield, commencing on Tuesday, the 13th of December, and continuing through Wednesday and Thursday, the 14th and 15th.

Also an annual meeting at Boston, to commence on Thursday, January 26th, and continue until Wednesday, February 1st, at which time the new members take their seats.

P. Stedman.
Geo. B. Loring.
John B. Moore.

## THE CULTURE OF THE CRANBERRY.

The Committee on the Cultivation of Cranberries, consisting of Messrs. Phinney, Cleaveland and Thompson, failed to report during the session of the Board, owing to the illness and necessary absence of the chairman. Major Phinney subsequently forwarded the following paper on the subject:

I have personally examined a considerable number of bogs, and have been a cultivator of the cranberry since the spring of 1856—yet I do not rely so much upon the facts and information which my own experience has given me, as upon the statements and collection of reliable data which has been furnished me by Amos Otis, Esq., of Yarmouth, Mass., who likewise acknowledges himself largely indebted to Prof. Agassiz, of Harvard University, for whatever of success has attended his investigation of this important subject.

Half a century has now elapsed since Capt. Henry Hall of Dennis, in the county of Barnstable, commenced the cultivation of the cranberry. His bog, or "cranberry yard," as he called it, has no year since, failed of producing a remunerative crop. For the thirty years next after Mr. Hall commenced, many experiments were made by others, and most of them proved to be failures. But these failures had their use; they prevented others from falling into like errors. The general cultivation does not date back farther than the year 1850, yet since that date there have been many failures, and many bogs recently set will never yield remunerative crops. By this term, and by "successful cultivation," I mean that the crops, including the present value of the bogs, have more than repaid the original cost, interest and incidental expenses of cultivating, picking and sending to market.

On the bog of Mr. Hall every fact necessary to be known might have been learned; yet the information to be derived from his experiments was not often sought or regarded. Almost every beginner had a theory of his own, not based on his own or the experience of others, and the result was, that nine out of every ten who made such experiments, failed of success.

During the last fifteen years cultivators have been more discreet. Before expending much time or money, they examined other bogs, collected information from those who had had experience, and thus avoided falling into some of the errors of their predecessors. Though many facts in regard to the culture, and much information has thus been obtained, yet no reliable system has been established. The science is in its infancy, and much is yet to be learned.

## SOIL.

The cranberry cannot be successfully cultivated on the "*Drift Formation*." Hundreds of experiments have been tried and all have proved to be failures. It is unnecessary to give details —they would fill a volume—and be of little practicable utility. Professor Agassiz describes the *Drift Formation* as being that portion of the earth's surface which was formed by glacial action, and consisting of rocks not in place; that is, loose, and not in solid ledges; gravel, clay and loam. The definition is plain and simple, and every farmer will understand it, and will be able to distinguish *drift* as soon as he sees it. In that *formation*, strata of sand are often found, but it usually contains some loam, and it is better to avoid its use. Bogs, naturally well adapted to the growth of the cranberry, have been ruined by using *drift* material in preparing them. In some bogs, where partly *drift* and partly *alluvium* was used, the exact line between the two can be traced by the difference in the growth and appearance of the vines.

The *Alluvial Formation* is the only one on which the cranberry can be successfully cultivated. Though this *formation* includes the most barren and the most fertile soils, the dryest and the most damp, yet its character is well marked and it can be easily distinguished. *Drift* is formed by glacial [ice] action, *alluvium* by water acting on the *drift*. Beach sand or quartz rock pulverized or granulated is *alluvium*, separated from the *drift* by the waves and currents of the ocean, and elevated into hills by the action of the winds. The deltas or rich interval lands near the outlets of rivers are *alluvium*, and are formed by the subsiding of the finer particles brought down by the current of the streams. The mud found in the narrow bogs and creeks, near the seashore, is of the same character. Salt and fresh meadows, formed partly by such deposits of mud, and partly by decayed vegetable and animal matter, belong to the same class. Peat differs from marsh mud only in this: one is formed in fresh, and the other in salt water. There are two, if not three distinct varieties of peat, but all peat and all mud, whether fresh or originally salt, seem to have the same influence on the growth of the cranberry, and practically may be regarded as the same.

The best soil for the cranberry is beach or quartz sand, overlaid by about a foot of turfy peat. Of this character are some of the most productive bogs in Harwich. In preparing such bogs all that is needed is to subsoil the same, bringing about three inches of sand to the surface. Underlaying the deeper peats the sand has become indurated ; but on exposure to the air, crumbles like meal or lime, and may be a useful top-dressing. If the peat is deep, and covered with rushes, wild grasses or bushes, the whole must be pared over, down to the bottom of the roots, and removed, and the bog covered with beach or quartz sand, from five to fifteen inches in depth.

On rich interval lands the same precautions must be used. If a thick coating of sand is not first spread over, it will be difficult to keep out the wild grasses, and if kept out, the cranberry vines will, as on the deep peats, make too much wood and be unproductive. Some interval lands are naturally adapted to the growth of the cranberry. Such are usually found near the sources of streams or on the borders of rapid rivers. They contain much sand and fine gravel, and are easily brought into cultivation. Of this character are the bogs of Mr. Samuel Lombard in Barnstable, and I am also informed that Dr. Miller's bog at Franklin is similar.

On pure, deep, black peat, the cranberry vine will grow more rapidly than in any other soil. A single crop will perhaps be obtained, and then the vines become abortive. The same is true of vines grown on rich intervals, if the wild grasses are kept out. The vines in such situations are very rank, the uprights of twice the length they are in productive bogs, and on comparing the two, it will be found that the unproductive vines are soft and flimsy, while the productive ones are stiff and hard. A careful chemical analysis of the two would probably disclose the fact that the productive vine contains more silex in its constituent parts than the unproductive. That this is so, is shown by the touch alone. The productive vines are harsh when drawn between the fingers; the silex with which they are coated grates the skin. Though unproductive vines are somewhat harsh, there is a marked difference between the two. This shows that silicious or quartz sand is a necessary element in the production of bearing vines. In proof of the correctness of this theory, I might cite the results of many experiments. I will refer to only one. Many years ago, Mr. Henry Hall transferred vines from his bog near the seashore, to which reference has been made, and set the vines on a deep peat bog near his dwelling-house. These vines grew very rapidly—soon covered the surface of the bog; but never bore fruit. There are some peat swamps, surrounded by sandy lands, into which, in process of time, the rains have washed, and the winds have blown sufficient sand to make the vines set in them, productive; but such bogs are rarely met with.

### DRAINAGE AND WATER.

The first point to which the attention of the cultivator must be directed in selecting a situation for a cranberry bog is drainage. If it cannot be drained at least eighteen inches below the general surface, the situation must be rejected. Flowage is not absolutely essential to success, yet to have water at command, so that the bog may be flowed, or the water raised in the ditches at any time, within twelve inches of the surface, is very desirable. Bogs that are kept flowed till the 25th of May or the first of June, insects rarely trouble; and where an abundance of water is at command, the damage often caused by early or late frosts may be prevented.

Where the drainage is imperfect it is impossible to keep out the rushes and wild grasses, and the vines become choked, and are rendered unproductive. Of this character is the bog near the county road, on the west side of White's Brook, in Yarmouth. Some of the vines have been set more than twenty years, and the soil is naturally good; but imperfect drainage has destroyed its value.

When a situation has been selected for a cranberry bog, the first thing to be done is to level it. A leveling machine is not necessary. All that is required is a strip of plank ten or fifteen feet in length, the edges jointed and made exactly parallel;

with this and a common carpenter's level the work may be quickly done. Stakes of a foot or more in length, cut off square at the tops, should be provided. Begin by driving one of the stakes so that the top will correspond with the proposed surface of the bog when completed. With this as the standing point, run several lines of stakes through and across the bog. If more convenient, the tops of the stakes may be elevated six or more inches above the proposed level. This operation is important because the stakes show where material is to be removed, and where filling is to be required ; and by making a little calculation, the earth to be removed may be made to exactly correspond with the amount required for filling. But this is not the principal advantage ; it requires much less water to flow a bog that has a level surface than one that is uneven. If the bog is extensive, and cannot, without too much expense, be reduced to one common level, there is no objection to having different grades with low dykes between them. It is said that in building railroads, nothing is ever lost by spending much time in engineering. This remark has force and truth in it when applied to cranberry bogs. The money and time spent in laying out the work to be done is always economically expended. All that is to be done, and *how* it is to be done, should be known before the work is commenced. In many bogs it would be economical to employ an experienced engineer, and have marked stakes put up, profiles and working plans drawn. With such marked stakes and drawings, the workman knows, when he has filled his barrow, where he is to tip its contents. There will be no mistakes, no alterations to be made, and in the end money will be saved.

The depth of the sand required depends on the depth of the peat. If the latter is only a foot or two in thickness, five inches of sand is considered sufficient ; if it is several feet, at least a foot is required to make a good bog. The more sand there is used, the longer it requires to bring the vines into a bearing state ; but when brought into that state, they continue to bear many years.

At Sandy Neck, on the north side of Barnstable Harbor, the cranberry has grown in natural bogs for hundreds of years. The soil in these bogs is beach sand, with a small admixture of peaty and vegetable matter. They prove that a large admixture of peat or mud is not essential to the growth of productive vines. Some experiments, however, have been made, showing that their productiveness is increased by spreading over them peat, or marsh mud. Some of these bogs are covered with water in the winter, and some are not; but in all of them water can usually be found in the dryest weather, within about a foot of the surface. A few bogs have been formed there by dyking in salt and fresh meadows, and covering them with sand. These have proved to be very productive.

At Provincetown, where the soil is very similar to that at Sandy Neck, the experiments have not been uniformly successful. A difficulty occurs there in obtaining the proper grade. In the wells of that village, the water rises and falls with the tide. Farther inland the same cause operates to a limited extent. During a course of high tides, the water in the lowlands, where the cranberry vines are set, often rises so high as to injure the crop; and during a course of low tides, if dry weather happens at that time, the vines suffer from drought. In situations not thus affected the cranberry is very productive. In the swamps where the mud is deep, the cultivators are troubled with wild grasses and rushes, and for that reason sandy bottoms are preferred. It is also found by numerous experiments that very little peaty matter is absolutely essential to secure a crop. The best and most productive vines are usually found on the edges of the bogs, where the sand was removed to the depth of several feet in grading. In such situations there is no peat or mud; but the water contains sufficient peat in solution to promote the growth of the plants. In such situations guano and other fertilizers have a good effect.

The spring of the year is usually considered the most favorable season for setting. The cranberry vine, however, is very tenacious of life, and will grow if set at almost any season. The usual course is to punch holes in the ground, about eighteen inches apart each way, and insert therein two or three vines, and afterwards press the soil around them. Dr. Shove, who has had large experience, sets the vines in shallow furrows, made with a common iron cultivator. He lays the vines down in the furrow, and covers them, leaving out the ends of the vines.

### INSECTS.

The habits of the insects that are injurious to the growth of the cranberry, have not been carefully studied, and sufficient information has not been collected to enable me to speak with confidence on this subject. There are two worms, known as the vine worm and the berry worm, injurious to the cranberry. The first is a variety of the caterpillar, about half an inch in length, with a black head. The other, when fully grown, is of nearly the same size, and has a red head, and probably belongs to the curculio family. The vine worm destroys the leaves and blossoms, and consequently the crop. The bogs in which they commit their depredations, appear as if they had been burnt over. The berry worm is usually found in greater numbers in the dryest part of the bog. Like the curculio, it destroys the fruit it enters.

The cultivators who have had the most experience, say that if the bog is kept covered with water till the 25th of May or first of June, these pests rarely commit any depredations. Cyrus Cahoon, Esq., makes this statement, and there is no man in the county who has had so good an opportunity to judge accurately.

One-half of the bogs in this county are so situated that they cannot be kept flooded till June 1st. Dr. Shove, of Yarmouth, Rev. Mr. Myrick, and other gentlemen in Provincetown, have perhaps studied the habits of these insects more carefully than any, and have experimented with decoctions of tobacco and other articles. They have been partially successful. Prof. Agassiz suggests that the following experiment for destroying the fruit worm be tried: First, to ascertain at what season of the year it appeared in its miller state, and having ascertained that, to build at night at that season of the year, small fires in the vicinity of the bogs. The millers will fly into the fire, and be destroyed. If every one who has a cranberry bog will watch the habits of these insects and report his observations, much valuable information will be obtained. This should not be carelessly done. The date of every observation should be carefully noted. If building fires is the remedy, it is all-important to know the exact date at which the insect appears as a miller, and how long he continues in that state. The probability is that he does not exist as a miller more than a week or ten days, and if the exact time is known it is easy to apply the remedy, These insects are said to be unlike any described in the books. Dr. Shove says the miller of the fruit worm appears about the time the berry begins to form. If subsequent observations confirm this, or if they do not, it is advisable to test the remedy suggested by Prof. Agassiz. Dr. Shove further states, that the miller punctures the cranberry and lays its eggs under the skin, in the same manner that the curculio punctures the plum or the cherry.

The reason that flowing till the first of June is not a perfect remedy against insects is, perhaps, this. In the fall when these insects change from a worm, and become a chrysalis, they bury themselves in the ground. All do not bury themselves on the bog, but on the borders. These are not affected by the flowage; but as the vines are kept back by the water, further investigations may show that these are the only ones that flowage prevents from committing depredation.

It has not been ascertained certainly that the chrysalis of these insects is destroyed by water, but the facts stated indicate that they are so destroyed.

Of late years many have been too careless in picking and packing their cranberries. This is a great mistake. They should be picked by hand, and spread, not more than five inches deep, in hurdles made of laths, left open so that the air can draw through them. These hurdles should be piled in a room for three weeks where the air circulates freely. If kept in this manner for a longer time it would do no harm, the berries would become perfectly ripe, and thereafter be less liable to rot, or to be injured by frost. When taken from the hurdles they should be winnowed, and every unsound berry picked out by hand. It is also important that the barrels or packages in which they are put up should be dry and clean.

### PROFITS.

That the cultivation of the cranberry is a profitable branch of industry, is now a settled fact. Thus far, perhaps, much more has been expended than has been realized. Many have lost all they have expended for want of information and want of experience, and a few who were lucky have realized large profits. Mrs. Winslow of Brewster, in this county, realized, in one crop, a thousand dollars from a single acre. I might name many others who have realized nearly as large profits. At the present time the man who carefully collects the information which has been gradually acquired during fifty years of experiment, may as safely rely on a profit from his investment as any farmer can from any other cultivated crop. This is strong language; but the facts will bear me out in its use. Can a single instance of failure be pointed out, where the mode of culture I describe has been carefully followed. I know of no single instance, and I have examined many bogs for the purpose of ascertaining the correctness of the theory and practice now recommended. I have endeavored to sift out from voluminous statements the facts that are of value, and I will now recapitulate them in a form easily retained in the memory.

1. The cranberry cannot be successfully cultivated on the *Drift Formation*, that is on a soil composed of clay or loam.
2. There must be the means of draining the bog, eighteen inches below the general surface.
3. All bushes, wild grasses, and roots must be pared off.
4. If the soil does not naturally consist of sand and an admixture of peaty matter, it must be artificially corrected; if peat, by putting on beach sand, or sand composed of fine particles of quartz rock; and if of pure sand by adding peaty matter.
5. It is desirable, but not essential, to have the command of water, so that the water in the ditches can be raised within twelve inches of the surface at any time, and also in sufficient quantity to flood the bog in the winter and spring.

*Cranberries raised in Barnstable County,* 1863, *and the prices for which they were sold per barrel.*

| TOWNS. | No. of Barrels. | Price. | Amount. |
|---|---|---|---|
| Harwich, . . . . . . | 2,697 | $9 50 to $10 00 | $26,934 50 |
| Brewster, . . . . . . | 611 | 9 00 to 10 00 | 6,031 00 |
| Dennis, . . . . . . | 423 | 9 00 to 10 00 | 4,054 75 |
| North Dennis, . . . . . | 402 | 9 00 to 10 00 | 4,000 00 |
| Chatham, . . . . . . | 168 | 9 00 to 10 00 | 1,640 00 |
| Barnstable, . . . . . . | 425 | 10 00 | 4,250 00 |
| Yarmouth, . . . . . . | 200 | 10 00 | 2,000 00 |
| Sandwich, . . . . . . | 175 | 10 00 | 1,750 00 |
| Provincetown, . . . . . | 125 | 9 50 | 1,187 50 |
| Totals, . . . . . . | 5,176 | – – | $51,847 75 |

Barnstable County was the earliest in the culture of the cranberry, and from the most reliable information that can be obtained, it appears that it produced nearly one-half of all that was cultivated in the State during the season of 1863.

S. B. PHINNEY.

BARNSTABLE, Feb. 22, 1864.

## THE STATE CABINET.

The cabinet or agricultural museum connected with the office of the Secretary of the Board, is designed to form as complete an exhibition as possible of the natural history of Massachusetts. Though by no means perfected, the collection is already the best in the State, if not the only exclusively State cabinet in the Commonwealth. The number of visitors—always very great during the winter season and the sessions of the legislature—is constantly increasing, and the effort to form a State collection seems to be appreciated. Owing to the want of space, but little effort has been made to add a collection of models of implements. An exceedingly interesting and instructive historical museum of agricultural implements might be made, illustrating the rise and progress of agricultural mechanics in New England, but the size of the rooms allotted to the Board, makes this impracticable for the present.

The additions to the cabinet during the past year have been considerable, though not so numerous as during some previous years. A catalogue of the birds in the collection will be found in the appendix. Similar catalogues of the minerals, the animals, the plants, the shells and fishes, have appeared in previous reports, though subsequent additions to all those collections make it desirable that a new catalogue should be issued.

Donations from all parts of the State are solicited. Proper acknowledgment will be made for contributions, and the names of donors attached to the specimens presented. The cabinet is at all times open to the public.

## THE INTERNATIONAL EXHIBITION AT HAMBURG.

In my last annual report, I took occasion, at the suggestion of the Board, to give some account of a trip to Europe, which I had made as a much needed relaxation from severe and long-continued application. Happening to be travelling in Germany in the month of September, I found, among farmers, the conversation turned upon a grand International Exhibition, which was planned on a magnificent scale, to come off in the month of July, 1863.

Little did I think, at the time, that, in the course of events, it would become my duty to cross the restless ocean again, charged with the message of good will and kindly feeling on the part of the farmers and people of my native State to the great and intelligent body of farmers and agriculturists who were expected to take part in a show of the products, the stock and the implements of husbandry of all nations. But in the preparation for the coming festival, the executive committee, consisting of several of the first merchants of Hamburg, and members of the German agricultural society, sent an invitation to every government in Europe and America to compete for the liberal premiums offered, and to extend the courtesy, at least, of appointing commissioners and delegates to attend the Fair.

The Board of Agriculture thought that it would be no more than a proper expression of good will and cordial sympathy in such an undertaking, to comply with the request of the Executive Committee, so far at least as to appoint a commissioner to attend the Exhibition, especially as some of the other States had already done the same. The appointment, quite unsought and unexpected, fell upon me, and hence the following

## REPORT:

No place on the continent could have been more appropriately fixed upon for holding an International Agricultural Exhibition, than the free city of Hamburg. It is accessible by water for all countries west and north, while the navigable Elbe, on whose left bank the city stands, furnishes the means of easy transport from Saxony, Prussia and Central Europe.

This noble river, connected with the rivers Spree, the Havel and the Moldau, unites the commerce of Hamburg with Upper and Lower Saxony, Bohemia and Austria, while a canal which connects the Spree and the Oder, opens a direct intercourse with Brandenburgh, Silesia, Moravia and Poland. It is the open doorway, as it were, to nearly a hundred and fifty millions of the population of Northern Europe, while it forms one of the principal outlets for the products of busy German industry; and hence the means of communication to and from it on all sides are numerous and well known. The city containing a little less than 200,000 inhabitants, holds under its jurisdiction about thirty-three square miles of territory mostly, but not wholly, lying contiguous to it. Seventy-two miles from the mouth of the Elbe, which, below the city, separates Holstein from the kingdom of Hanover, the navigation is attended with more or less obstacles, but notwithstanding this, its commerce has long maintained a prosperous position, till it has been asserted on good authority that it is the third town in the extent of its imports and the fourth in exports in the world.

In 1842, a destructive conflagration swept off a fifth part of the city, with its narrow and dilapidated streets, with many magnificent churches, which, since then, have been rebuilt with increased splendor, so that now the stranger finds the signs of wealth, and taste, and luxury on every hand, in broad and beautiful avenues, in public promenades lined with trees, in the magnificent Alster Basin, an artificial sheet of water, covering many acres in extent, and adorned with the finest residences, or extensive shaded pleasure-walks.

The spot selected for the great International Exhibition was on the *Heiligen Geistfeld*, (field of the Holy Ghost,) about a a mile from the centre of the city, easily accessible and well located just outside the Dammthor gate in Holstein. I arrived at Hamburg on Saturday, the 11th of July, and the grand opening of the Fair was to take place on the Tuesday following.

The main entrance to the grounds was built in the form of a magnificent triple triumphal arch, surmounted by the emblem of the city of Hamburg, the three-turreted castle, around which were elegantly grouped the flags of all nations. The interior of this arch was adorned with the most tasteful panels in fresco. Green wreaths hung in graceful festoons from the angles, while above, on the outside, stood, in beautifully colored letters, the inscription designed to inform the uninitiated that all this was the "*Internationale Landwirthschaftliche Ausstellung*," or International Agricultural Exhibition.

Entering through the archway to the inside, the impression made upon the mind was in the highest degree pleasing and agreeable. In front is a pretty pond, tastefully arranged with a fountain, beds and parterres of flowers, and on either side a magnificent show of flowers and greenhouse plants designed as an ornamental appendage to the main features of the show. Here also is the pavilion for the music, in the form of a pagoda surmounted with statuary, and still beyond, a highly important feature, a great establishment for refreshments in the shape of beer, bread and butter and coffee.

The long ranges of tents for the stock, the implements and the infinite variety of products, were hung with the flags of different nations all flung to the breeze, but unfortunately they have no significance, other than as ornaments and of the general gathering of the nations. Here waves the Turkish Crescent over a shed full of English steam-engines and other implements, and there again the Elephant of Siam over another British collection, while the English flag flaunted exultantly over the shed of American implements, and the United States flag over other departments filled by other nations. It takes a large part of a day to become familiar with the topography of the place so as to be able to find the various parts without delay and loss of time.

The grounds were oblong in shape, embracing over eighty acres, surrounded by a high board fence, while the sheds ran lengthwise on either side of the main avenue, at the end of which were ample rooms and offices for the use of the committees and commissioners from the various countries.

It was a unique and highly interesting international gathering. The variety of costumes and languages, the characteristics of the various breeds of stock, so different from what we are usually accustomed to, had its effect upon all present. The number of distinguished visitors was by no means small, nor the list of their names short. Dukes and barons figured largely. Among them the Duke of Mecklenburg-Schwerin, the Duke and the Princes of Holstein, Prince Frederic of Hesse-

Cassel, the Duke of Coburg, Prince Esterhazy, the Duke of Raphibor, the masters of horse of the King of Prussia and of the King of Hanover, and many other dignitaries from nearly every country of Europe.

The entries in all the classes were very large, those in the department of live stock counting up to 3,876, and of implements 2,941. Of the live stock the sheep most decidedly took the lead in point of numbers. It was the largest, and, as a whole, by far the finest show of sheep that I ever saw, the entries numbering 1,766. They came from all parts of the continent, and from Great Britain. Next in point of numbers came the neat stock, in which department there were 965 entries, the entries of horses coming up to 524, the swine to 293, the poultry to 328. Where all departments were so extensively represented and so interesting, it is difficult to say which was the most attractive. The cattle were sufficient in numbers and interest to have occupied one's time during the exhibition in a careful study and examination of their peculiar points. Among the most striking in point of numbers were the long and beautiful rows of black and white, which a stranger would be inclined to set down as all Dutch.

In the north of Holland there is a long arm of the German ocean stretching down into the very heart of the country. It is the Zuyder Zee. It is surrounded on three sides by a low and marshy country, the accumulated deposit of successive ages. It is cut in many directions by sluggish streams, and still more sluggish canals, whose banks are so raised as to prevent the rush of the tide over the green, luxuriant farms. To the west of the Zuyder Zee, North Holland juts up to divide it from the channel ; to the east lie Friesland and Gröningen bounded on the north by the ocean. The land in this stretch of country is extremely rich and easily tilled. The same kind of soil in fact, and the same general features characterize the whole coast line from Flanders and Belgium, along round the shores of Holland and Hanover as far as the Elbe, on which lies the great city of Hamburg, and so still further to the north and east, taking in Holstein and Schleswig. It is a magnificent stretch of marsh land, much of it diked in with incredible labor, from the treacherous sea, and now covered here and there with low but comfortable farm-houses, and a thrifty, honest, hard-working class of farmers.

It was here, especially along the more southerly and westerly line, that modern agriculture in Europe made some of its earliest advances. The climate is moist, and exceedingly well adapted to lead to an extraordinary development of the cultivated grasses and other plants, so useful in the nourishment and perfection of a large and noble race of cattle. On such a soil and in such a climate we should expect to find the grass-feeding animals, of all kinds, attaining a size not generally observed in other circumstances.

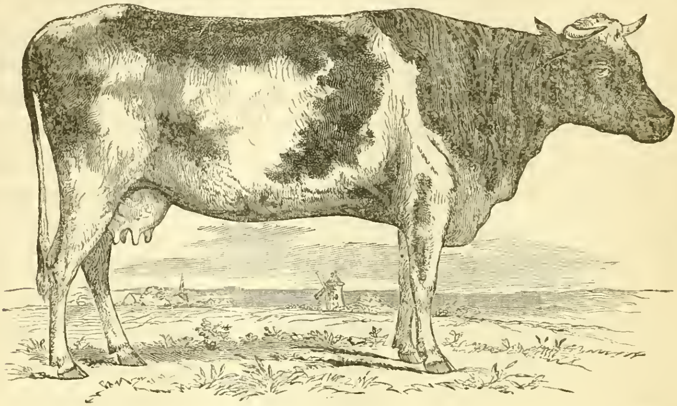
If we look over the races of cattle that have grown up as natives of these low marshes, or netherlands, different as they are in many respects, we shall find the same general characteristics running through them all.

Perhaps the Dutch may be taken as the most prominent type of these lowland or marsh races. It is found in its greatest purity in North Holland, Friesland and Gröningen, but is really very much more widely spread than we should conclude from the size of these provinces on the map.

On entering the grounds of the International Exhibition, the stranger was struck with astonishment at the great preponderance of these marsh cattle, which the careless observer would be inclined to set down without hesitation as all of one breed, but a closer inspection would soon satisfy him that black and white cattle came from more countries than one.

The Dutch belongs naturally among the larger races. Its bony structure is only a little above the average weight; the head usually rather small, the horns rather short, stout, and inclined forwards; the neck is not heavy, but rather long and sunken or curved, and furnished with a rather large dew-lap; the shoulders are strong and thin; the rump large and broad; the hip, or loin, is broad, with prominent hip bones, and sloping off behind; the legs are rather long; the thighs small. The general look of the animal is rather thin than fleshy, rather sharp and angular than well rounded; but some possess a more uniform structure, standing less high on the leg, more barrel-shaped, and with less than the usual slope or falling off behind. The hide and hair are, for the most part, mellow; the color is almost always, but not invariably, spotted, the black and white predominating. A few are red and gray spotted, some almost all black, and a few almost all white.

This cut gives an accurate idea of the form of a Dutch cow.



Dutch Dairy Cow.

The most striking characteristic of this race is its milking qualities, though the milk is thinner and more watery, on an average, than that of the better highland or mountain races. The cows bring very heavy calves, and the young stock on sufficient nourishment, rapidly attains great weights. But it requires rich feed to do it, and without it, it does not justify its otherwise distinguishing qualities. I saw some specimens of this race that had been bred for thirty or forty years away from its native home on the lowlands. Their forms had grown rounder, and the hip less sloping.

The Dutch formed a prominent and marked feature in the show, the number of animals about a hundred and thirty, many of them from the finest herds in Holland.

But there were hundreds of black and white cattle that filled the neighboring sheds, that did not come from Holland. They swarm on the marshes to the east of the Dutch border, extending along the coast as far as the Weser, especially in a division of the kingdom of Hanover called East Friesland, and in Oldenburg, lying a little to the westward of Bremen. The general appearance is strikingly similar to the Dutch, but on careful examination, it will be seen that the neck is generally stronger, the rump less sloping, the bony structure proportionably somewhat heavier. The prevailing color is black and white, and the milking qualities are said to be less remarkable than those of the genuine Dutch. They are, no doubt, capital working oxen. The number of animals entered and shown in the class of these marsh races, in addition to the Dutch already mentioned, was 312. But many of these came from Holstein, others still from Schleswig.

Along the Holstein and Schleswig marshes, a continuation of the great coast chain already mentioned, the native breeds are closely allied, in their chief characteristics, with the Dutch. But there are more or less breeds distinguished by local peculiarities.

Among the local breeds are the Wilster marsh cattle, many of which were exhibited at Hamburg. They are for the most part red brown, sometimes red and black variegated. They are especially prized for their beef qualities. Another prominent local breed is the Dithmarsh, in the northwestern part of Holstein. Many fine specimens of this breed were on the ground. This is also of variegated colors. Holstein lies directly north and east of Hamburg. Altona, the capital, is less than a mile from the Exhibition grounds. Schleswig again is just north of Holstein, and forms the connecting link between Germany and Denmark. It is a narrow country separating the Baltic from the German ocean. Now between Holstein and Schleswig there is a little river called the Eyder or Eider, and along this there is a breed, also well represented in the exhibition, called the Eidermarsh cattle, still red variegated, or red and black variegated.

In the higher, or inland parts of Schleswig, there is a more uniform red class of cattle, which shows a relationship with the breeds in Northern Germany, but the variegated colors predominate, especially the red and white spotted, in the cattle of both Schleswig and Holstein, while the form is generally more rounded and the rump less sloping than in the Dutch. They are prized not only for their good milking qualities, but also for easy fattening.

On the easterly border of Schleswig there is a department called Angeler. It possesses a light built race of cows, scarcely of the medium size, for the most part red, sometimes a little variegated. These little Angeler cows are bred in immense numbers by the peasants who there own most of the land themselves, and who every year send down great droves of young stock to Holstein, Mecklenburg, and Pomerania to supply the dairies there with fine milch cows. On tolerably rich pastures it gives a good quantity of milk, but it is accustomed to good feed and less patient of rough usage than the cows from Jutland, which stood alongside, and which still show the marks of relationship with the lowland or marsh races.

The Jutland cow is rather small, often very small, and of a fine bony structure. The rump is proportionally broad and deep. The prevailing color is black variegated, or black brown, sometimes a sort of mouse color. It is used to rough keeping and takes kindly to scanty fare, and so it is often sought after by the small North German farmers, who happen to till hard farms, as a valuable and hardy milch cow, while the oxen are sent in great numbers down to the Schleswig and Holstein marshes, where they easily fatten and make excellent beef.

Fine specimens of all these races were on exhibition and attracted considerable attention.

Thus far we have seen only what have been called the marsh, or lowland races. If now we take a look at those mountain cattle in the shed there yonder, we shall see another type whose main features, like those already mentioned, are, no doubt, in a great measure due to local circumstances, climate, soil, and treatment. But the result has been an animal differing considerably in structure and character from the races on the marshes. The body is in general more close built, powerful, well arched and rounded, low set; the rump, for the most part, rather higher; the chest is broad, the neck thick and stout, with strong dew-lap; the head broad in proportion to length; the horns of proportional size, and mostly inclined to the side and upwards. The color is not uniform, but the dark prevails. In size and weight the different breeds or races, under this class also differ widely.

Some have sought to trace out the derivation of these points of difference in considerable detail, saying that the marsh races get their long neck from the fact that they have to seek their food on the plains. By the constant reaching forward on the pasture, the head becomes longer and sharper, the horns take a forward direction, and they grow higher on the leg. But the highland or mountain races, climb the mountain in seeking their food. The weight of the body rests on the hind-quarters, and these become stronger and more prominent. The head is shorter, the horns stand out more to the sides, the neck grows shorter and thicker as the result of less stretching forward, the cow generally feeding up the mountain side. This may appear a little far-fetched, yet there can be no doubt that location, climate, and soil, operating for generations on the animal structure, produce very striking modifications.

The finest types of the highland races of the continent are, no doubt, to be found in Switzerland. They are not only remarkable in many respects for the most excellent qualities, but have had for many years a widely extended influence in forming most of the more local breeds in various parts of Germany. The Swiss or mountain cattle are by no means uniform. There are as many different breeds as are to be found among the marsh races.

First among them may be named the Bernese, natives of the cantons of Berne and Freyburg. Those on the show-grounds are fine specimens, pretty as pictures, but they looked as if they longed to be away, straying over their mountain pastures and through the rich valleys where they might breathe the air of freedom. These creatures are generally red-brown and white, often black variegated. Sometimes we see one nearly all red, and then another nearly all black. In the valleys, where they are often stall-fed, they are very large and heavy, the frame frequently round and full, the head and skin thick, the hair hard, the hind-quarters large and the root of the tail set high up. Those that are prettily and finely marked are much sought after when they are up to the standard in form and do not become coarse in structure; and with food and keeping sufficiently good they yield a satisfactory return. The oxen are not especially adapted either for work or the shambles. As a general rule, they are not the most profitable for ordinary farms, though they strike the fancy and are well adapted for speculation. They sell well to drive out of the country. Still, if selected properly, avoiding oversized and overfed animals, there is no doubt that beauty and utility might be found combined. They throw large and beautiful calves, which sell well. I saw many of these fine animals in their native valleys and along their accustomed mountain walks. They are common in

Berne, though by no means the only kind of cattle kept in the canton. They are very common in the Bernese Oberland, and extend up into the Simmenthal and Saanen, where they are often found encroaching upon the jurisdiction of the true Simmenthalers.

The Simmenthaler cow is more frequently a sort of brownish red. Sometimes she has a white face. She is kept in those districts where the mountain pastures are devoted especially to the production of milk. The entrance to the rich valley of the Simmen is between the Stockhorn and the Niessen, rising up from the beautiful Lake Thun. It is richly cultivated, abounding in fields and orchards, gardens and meadows, rising to the very tops of the hills. Fir forests, rocky gorges, and fertile, sunny nooks abound through the valley, and give it a genuine pastoral character.

Here we often find a little lighter and better proportioned bony structure in the cattle, with more delicate heads, finer horns and skin, and excellent milking qualities. These cattle are remarkable for the rapid and early maturity of the young. Many of them are yellowish brown, others have white spots. They fatten easily on good feed and proper care. The cows weigh on an average from 1,300 to 1,350 lbs. Some of them go up to 1,600 lbs., while the bulls often reach 2,200 lbs. live weight, and have been known, at six or seven years, to reach 2,700. The whole population of Simmenthal and Saanen are cattle owners and dairymen. They make the fine cheese, now exported to all parts of the world as Gruyére cheese.

Another Swiss breed, known as the black-brown or gray-brown, is found more widely spread in Switzerland. They are seen in immense numbers in the cantons of Schwytz, Lucerne, Zürich, Appenzell, Uri, Unterwalden, and the Grisons, embracing nearly all of Eastern Switzerland. The color is a kind of iron gray or dark brown, passing over in some instances to bright gray and light brown, and having a light stripe along the back, bright colors on the under part of the body and on the inside of the thighs, and a bright circle around the muzzle. The hair in the ears is also light. This is one of the most beautiful and widely spread of the Swiss breeds.

After the exhibition was ended I visited the above-named cantons, partly for the sake of studying the peculiarities of these cattle a little more closely. They differ in some minor points in the different sections, but have many points in common throughout these wild mountain regions. In passing from Lake Zürich to Zug, for instance, a rich and highly cultivated section abounding in fertile fields and orchards, and so on to the canton of Schwytz, over the ruins of Goldau, we see them marked by a heavy and well-rounded form, with very broad and widely-built hind-quarters, often a little sunken behind the shoulders. Hundreds of these cows are seen in the ascent to the Rigi from the canton of Schwytz, and in the descent to Küssnacht on the Lake of Lucerne; but as we pass on through Unterwalden and Uri the size is, perhaps, a little smaller, and in the Grisons it is only medium. The head is usually narrower, the neck thinner, the tail not so high set as in the larger spotted race. These dark gray cows give great yields of milk, and bring heavy calves.

I saw these fine cattle in the imperial dairy at Vincennes, where they have the credit of being the best for dairy purposes of any they had. The Ayrshires and the celebrated Flamand cows stood alongside in competition with them. They are sent into Italy in immense droves, over the Splügen Pass and the St. Gothard every fall, as well as over the St. Julier and Maloya Passes into Lombardy.

In the little canton of Appenzell, lying to the east of St. Gallen, and extending up to the Lake of Constance on the south, there is a class of cows known as the girdled breed, having a broad white band extending round the whole central part of the body. The rest of the body is usually red or mouse colored. Their chief characteristics do not materially differ from the Schwytzers, just mentioned.

Then lying to the east of that great mountain-skirted canton of the Grisons, come the districts where the Algäuers and the Montafoners or Voralbergers graze the luxuriant mountain pastures of Tyrol. The Montafoner cows seem to be closely allied to the Schwytzers, as if an active trade had been carried on at some former period and the stock had somehow got mixed up. The Montafoner is of medium size, the predominant color rather darker than that of the Schwytzer, while there will often appear more or less white spots, and the back is generally swayed.

The Algäuer cow is generally of a brighter color and varies more. She is also of medium size, of fine bony structure, and takes kindly to scanty fare. The Algäuers have spread considerably into some parts of Germany, especially in Bavaria, where they are much esteemed for their milking qualities. Many Algäuers were on exhibition. They were gray, or silver gray, for the most part, some of them yellowish gray. I saw many fine Algäuers in the barn at the Agricultural College at Weihenstephan in Bavaria.

There is a cow known as the Zillerthaler, in that part of Tyrol watered by the Ziller. It is of a chestnut brown, with a short, broad head, short legs, strong in the bone, wide built, thick neck,, well loaded with flesh, and large dewlap. The hind-quarters are fleshy, the tail thick, short, high set at the root, but the body is rather snug, and beautifully rounded. They give a rich milk, but not much of it, and are better adapted for fattening.

Next alongside are the Mürzthalers. They originate among the Tyrolese Alps, in Styria, especially in the valley of the river Mürz, in the southern part of Austria proper, but the breed is widely spread, on account of its high reputation, in Upper and Lower Austria, to considerable extent in Bohemia and in the forest districts of Bavaria. It is found also in many other locations. There can be little doubt of its original connection with the Hungarian, though it now exhibits marked differences, the whitish color passing into a bluish gray, or badger color. The animals with head, neck and tail quite dark, almost black, are held in the highest estimation. The color of a Mürzthaler cow will sometimes approach that of the Algäuer, being considerably lighter and more fawn-colored, while they all have the light circle around the eye. The horns are short and turned back, in the males, especially, very white, with black tips.

The calves all have bluish or blackish tongues. It is a mark of purity considered essential. They all have the circle about the eyes. They have a very small star in the forehead, long and straight. The muzzle is whitish, the tail set on high enough, but not so as to be a defect, the color badger gray. These are among the requisites of a Mürzthaler without which she would not be considered pure bred. The milking qualities are good.

Individuals are met with, it is said, that will give over 3,100 quarts a year, and the dairymen of Vienna often buy them soon after calving, at large prices. They easily take on fat also. They will usually make a pound of beef on 30 lbs. of hay or its equivalent. The oxen are used for work from three to eight years in the valleys, and to five or six years on the mountains; then they are fattened and sold. The beef is not so high-flavored as that of the Hungarians. As working oxen they rank perhaps next after the Hungarians.

In regard to the proportion of dressed beef to live weight, the oxen, before being fattened, will dress from 43 to 50 per cent. Oxen well fed and half-fattened will dress 52 to 60 per cent. Oxen thoroughly fattened, including tallow, dress 70 to 77 per cent. The proportion of tallow to dressed weight is, for oxen not fat, 5 to 10 per cent., half-fattened, 10 to 15 per cent., completely fattened, 20 to 25 per cent. In feeding, 3,000 lbs. of hay or its equivalent are required to make 100 lbs. of fat, but in animals of very fine bones, and fine and soft skin, the amount required is far less, say 2,000 or 2,400 lbs., or its equivalent, while with animals of very large bony structure and thick skin, 4,000 to 4,200 lbs. may be required.

Thus we have noticed a few of the more prominent mountain breeds of cattle on the continent. The Alpine mountains are the great breeding places which supply the crowded populations below with meat. The wide stretches of mountain pasture among the Alps are swarming with cattle through the summer. Every sunny slope is alive with them, and it is rare that the traveller among those Alpine heights cannot hear the musical tinkling of myriads of bells, some of them close at hand, others just audible in the distance, while he can often distinguish whole herds too far up and too far off to enable him to hear their sounding brass. Pasturage is cheap there, in summer, and it is impossible to get any return from the soil in any other way. In the plains the land commands too high a price to enable the owner to compete with his mountain neighbors in pasturage, and the raising of cattle declines in proportion as the price of land increases.

The Alpine cattle-breeder raises and keeps more cattle in summer than he can feed in winter. He is obliged to sell more or less on the approach of winter, and to feed out his straw and everything else that is eatable. If then they come out poorly in spring, he knows the rich, sweet, mountain pastures will soon bring them up. It is astonishing with what care the grasses for winter hay are husbanded, in those regions; one would suppose it was the chief duty of man, woman and child to make hay while the sun shines all through the season. Boys use the sickle in almost inaccessible nooks, where it is often dangerous to climb, and very few clumps of grass are allowed to ripen where it is possible for human ingenuity to reach.

As I alluded, at some length, in my last Annual Report, to the Hungarian cattle and the vast plains which they cover, it would not be proper to dwell upon them here, were it not that they are probably the true original type and source of the horned cattle of Europe and America, and that they were pretty well represented at the show.

The true Hungarian stock, which now appears to be indigenous to the vast plains which cover more than a third of all Hungary, would appear to have been introduced originally at the time of the immigration of the Huns themselves. They were a nomadic people, devoting their attention to the tending of cattle, and it is not probable that they would have established themselves in their new homes without bringing along their flocks and herds. This opinion seems to be confirmed by the fact that the same race still exists with but slight modifications, such as would be expected to arise from difference of treatment, climate and soil, in the Ukraine, in Moldavia, Bukowine, Volhynia, Podolia and Wallachia; and, in fact, throughout all the plains of the south-east of Europe covering the Crimea and the shores of the Black Sea and the Sea of Azof, as well as on the flat countries along the borders of Asia, and along the Ural Mountains, to Siberia. Taking the whole of Hungary proper, including Croatia and Sclavonia, the number of these cattle would amount to from four and a half to five million head, of which about one-third are males and two-thirds females. This pure indigenous race not only covers the plains but the undulating or hilly districts, embracing, together, five-sixths of the whole country. In the mountainous parts, there is said to be a mixed breed, small in size, the result of a cross of the Hungarian and some stock from the neighboring countries on the north.

There are two varieties of the pure Hungarian race. One is a pure white, the other of a mixed gray or ashy gray. Both are of a powerful structure and of very long, erect, branching horns. There is no essential difference in the physical structure of the two varieties, and large breeders keep the one or the other as a matter of taste.*

The Hungarian cattle are hardy in constitution, high and slender in form. The legs and the horns are long, the latter seldom less than three or four feet, often five to six feet from tip to tip. The structure of the head and of the body is regular, beautiful and striking; the head, in particular, finer and more pointed than on animals of other races. The forehead is slightly curved, the position of the eyes a little oblique. The look is mild and open, and full of courage; the chest is full, strong, and formed for work; the dewlap neither large nor hanging; the sides are rather flat, the loins strong and broad, the back generally straight. There is an air of nobility in the whole structure of the animal, as if conscious of its long and irreproachable pedigree from the flocks of the early patriarchs; every movement is one of vigor and agile life. The head is carried high and proudly, the form is lofty; indeed, all its qualities are very decisively marked.

To say nothing of the fine taste of its beef and its easy fattening, it is without a rival for work so far as regards power of draft, vigor, quickness and ability to endure fatigue, among all the herds of Europe. In these respects, indeed, it equals the horse, and it is well known that a good pair of Hungarian oxen, on a good road, can readily take along a load of from 4,000 to 5,000 lbs. They are of incomparable mildness, intelligence and docility, and possess the valuable quality of satisfying themselves on common food, of enduring many privations without much suffering, and of fattening easy after eight or nine years of labor. But they are slow to mature, and are hardly fit to be put to work before four or five years old. Still, if they begin late they hold out long. And when done work they fat off easily, and the proportion of tallow to beef, and that of the dressed to the live weight of the animal, is very largely in his favor, as compared with other races. There are cases where the tallow has been 25 to 30 per cent. of that of beef, while the beef will not unfrequently dress up to 65 or 70 per cent. of the live weight.

But in the production of milk there is nothing to brag of. Here the Hungarian cow falls below the standard, not only of what is considered a fair yield of other races and breeds in Europe, but of what it is proper for a cow anywhere to give. The milk is rich, but neither abundant or long continued. According to accurate experiments, it has been found that the average annual yield is only 678 quarts. Taking this as a unit, the product of an English dairy cow would stand at one and two-fifths, of a Swiss, at two, of a Dutch, at three, as a general rule; that is, in the normal or ordinary condition of things. Many well fed and well cared for Hungarian cows give a good deal more than the average, some of them giving over 900 quarts a year, which is still small. As a partial offset to this, it should be stated that the Hungarian cow is small as compared with the large breeds of Europe, and that she requires a proportionally small allowance of food.

A fat Hungarian ox will dress from 535 to 565 pounds, besides from seventy-five to ninety pounds of tallow. A fat cow will dress on an average about 490 pounds, with about sixty-three to seventy pounds of tallow, in addition. Hungary sends from 2,000 to 3,000 head of cattle a week to the Vienna market. The main object of raising cattle in the country is for beef and for labor. Some cheese is made, but not a great amount.

Other European breeds have been imported and kept in certain parts of Hungary, in some cases for the purposes of crossing; and in others, as at the Agricultural Institute at Altenburg, for purposes of experiment and breeding. These are the Schwytzer, the Mürzthaler, the Bernese, the Frieslanders, &c. The Schwytzer takes the lead in richness of milk, but except in this particular fitness for the dairy, no race surpasses the indigenous Hungarian.

The beautiful iron-grey cattle, which I took occasion to allude to in my last report, as inhabiting the campagnas in the Roman States and in Tuscany around Florence, resemble the Hungarians so strikingly that there can be little doubt they were originally brought from Hungary. The intimate relations of the two countries and the frequent inter-communication many centuries ago, are well known to the reader of history.

We have observed thus far chiefly the two great divisions of the cattle of continental Europe under the head of the marsh or lowland and the mountain breeds. But it remains to speak of the stock to be found through the greater part of Central Germany, extending easterly through Bohemia and Moravia to Poland, and westerly to the middle of France, for though they cannot be classed under the head of any one race or breed, they will be found to have some general characteristics in common, and to differ in some general features from the pure representatives of both the great classes already named.

The cattle of this great central division are generally red, reddish brown, red and yellow. In respect to size and usefulness, they of course differ considerably, but still it will be found that many very important breeds have been developed among them. Those in south-westerly portions, especially in those sections bordering on the more mountainous regions of Switzerland and Tyrol, incline to the forms ascribed to the races in those countries, while those in Lower Germany appear to be more nearly allied to the marsh races.

In the main, however, they are of middling size and weight, often falling rather below it, fine in the bone, often well formed, though somewhat small in the hind-quarters as compared with the mountain cattle. The horns are inclined to be rather large. They are usually pretty well adapted to the yoke, and many of the breeds fatten readily, but generally speaking their milking qualities are most important. I have already mentioned the Algäuer race as having spread into parts of this region as in Upper Swabia. There is a smaller animal that appears to be allied to that race, finer in the bone, a cow red in color, of under size, accustomed to poor feed and a rough region, and naturally hardy and easily kept. She is generally a very good milker. This little red animal is common also in other parts of Würtemberg, where it has been crossed with the red or spotted Swiss, and formed a breed called the Neckar breed, which spread along the Rhine and into Baden.

Another breed considerably known in Würtemberg, is the Swabian-Hallish. It is dark red with a white head and stout horns, of middling size and strong bony structure. The neck is provided with a strong dewlap, while the formation of the hind-quarters indicates a relationship with the Simmenthaler cow, with which it has been more or less crossed. It is excellent for the yoke and for beef, but in milking qualities only middling.

The Swabian-Limburg breed is also considerably spread in some parts of Würtemberg and down through the Odenwald. It is dark yellow and reddish yellow, or fawn, of fine, well-proportioned bony structure, soft skin, with fine horns. The cows are small, the oxen strong and useful. In fact this breed unites the most useful qualities of adaptation to the yoke, beef and milking in a greater than ordinary degree. It is the animal for small farmers.

A little above Worms on the Rhine, there is a considerable tract of country known as the Palatinate, extending southerly up along the western side of the river, as far as the French border, and westerly as far as the Prussian province of Treves. It is under the jurisdiction of Bavaria. Here is found a very pretty and excellent little class of cattle known as the Glaner race. It was not largely represented at the Exhibition, but still the six or eight fine specimens shown were sufficient to give an idea of their looks and most striking characteristics. The animal is rather below the medium size. The oxen attain, on an average, only about seven hundred pounds, though they sometimes reach eight hundred, but rarely ever go up to one thousand pounds. The color is yellow, red, dun, or fawn, sometimes sporting into white, but never black or spotted. They are well built and celebrated for milk and for fattening. The body is close and compact, legs short, light in the bone, the ribs well curved and the chest broad and deep. The look of the animal is mild and confiding, the hide tender and yielding, the hair fine, the movement in general light, the whole exterior indicates capacity and willingness to work, to give milk or to lie down and quietly take on flesh for the profit of the butcher. A cow of five hundred pounds will sometimes give over twenty quarts of milk, and sixteen or eighteen is a common yield. The cows go dry only about four weeks before calving. They are apt to "run to milk" and run down in flesh when in full flow, but pick up again very fast as they dry up. The milk is rich. The cows are generally very well marked, taking Guénon as a standard. But no effort has been or is made to develop their milking qualities to any extent. Neither butter nor cheese is made as a business; the cows being kept mainly to supply the wants of the household but little importance is attached to milking qualities.

These cows, like most others, do not attain their full yield till after the third calf. A Glaner cow after her first calf will seldom give promise of the great milker she is to make after two or three years' experience. But those who start off moderately in life, not creating any great glare of attention by brilliant performances, are quite as likely to bring up well in the end as those who make more of a show at the outset. Besides in the Palatinate the cows have most of the ploughing, harrowing and other after culture to do. A small farmer of eight to ten acres, raises a pair of steers perhaps each year, and accustoms them to the yoke as soon as they are two, keeps them some months at light work and sells them to the larger farmer, who keeps them one summer at work on his place and sells them at a profit to a still larger proprietor, who keeps them six or eight months according to circumstances, then fattens them off. Sometimes they change hands four or five times before they are crammed for the butcher, and each one is sure to make something on them. This constant buying and selling makes tradesmen as well as farmers of them all. Every farmer is ready to sell if he can make a few florins. There are no less than forty-four well frequented cattle markets in the Palatinate.

The flesh of the Glaner cattle is said to be remarkable for tenderness, superior in this respect to that of the Swiss, while another advantage consists in their ripening up young. A Glaner ox feeds up well at four years, and can be turned for good beef at three.

The cattle in Franconia, a division in the northern part of Bavaria, are for the most part red and brownish red in color. This breed extends north to the Thuringian forest and east into Bohemia. It is of only average size, the frame is heavy, but rather light behind. The horns are large and beautiful. This is the old native race of that section. The Ansbacher is the most widely known perhaps in the middle of Franconia, and has a high reputation in Germany. This is the result of crosses of the Bernese or spotted cattle with the black and white Dutch and the Frieslanders mentioned among the marsh races. This animal is high on the leg, with horns shaped like those of the Frieslanders, with the inclination to the coarseness of bone of the Bernese. It often attains extraordinary size, is celebrated for its milking capacities and its inclination to fat, but requires pretty good keeping. The color is reddish, with white or black spots, or mottled. Many thousands are exported every year for fattening, especially to the great beet-sugar manufactories around Magdeburg, in Prussia.

These cattle are found throughout the ancient Franconia, about Nürnberg, and so to the north and east.

The Vogelsberg race is another found to some extent in this division. It possesses a rather close analogy to the Franconian, but is smaller and not so well made.

Next comes the Voigtländer breed, of which there were several fine specimens on exhibition. This animal is reddish brown, of middling size, the head rather short, the muzzle small but rather broad, over which the skin often appears in folds; the horns large; the neck has a hanging dewlap; the chest is broad, and so is the rump; the body rather long and well arched; the legs fine, and well set. The animal has a mild, pleasant look. This breed is very well adapted to the yoke and for fattening, but its milking qualities are not very remarkable, though some speak well of it in this respect. It has gone largely in the cattle trade to England.

There is a breed known as the Egerlander connected with the Voigtländer. Its color is chestnut brown, or reddish brown; rather smaller and lower built, though of a powerful frame. It is also excellent for the yoke and for beef. I think there were no specimens of this breed at the International Show.

The exhibition of French breeds, though not very numerous, was interesting and attractive. Among them were a few of the little Bretons, of Bretagny cows, that I took occasion to allude to in my last Annual Report, as having been exhibited in considerable numbers at the show of the Royal Agricultural Society at Battersea Park.

These cattle are small in size, very small consumers, and many of them very pretty. They are said to sell in their native pastures at from sixty to a hundred francs, or twelve to twenty dollars. They will give, on an average, from four to six quarts of milk, of a very good quality, full of butter. This is the poor man's cow, the pet of small farms and hard pastures, hardy, docile, living and yielding a good product longer than most other breeds, satisfied with little, and with that little coarse, willing to shirk for itself around the house or along the highway. I saw fine specimens in the stalls of the agricultural college at Grignon, near Versailles, but they were stall-fed the year round, like all the other stock, and looked as plump and round as any of them. The color is generally black and white. The head is small, the hide soft, flexible and yellow, the hair short and fine, the horns small, slender and smooth, the tail fine. They get into such a habit of yielding milk that they continue often till twelve or fifteen years to milk well. It is said they lose only about a quarter of their greatest flow at the age of sixteen to eighteen, and retain more than half till eighteen or twenty. In countries where the soil is poor or exhausted, they do well and prosper, and are good to prepare the way for a larger kind of cattle, which on good soils it would be more profitable to keep. But they would not be worth much for heavy work.

There were a few of the large brindled Normans, strongly contrasting in size with the little black and white Bretons by their side. These come from one of the most fertile departments of France. Normandy has rich pastures, and rich pastures, especially if over a limestone formation, rapidly build up the form and structure of the stock that feeds on them. There are two divisions of these Norman cattle, one called the Cotentin, and the other those of the Auge. The former are the largest, and make excellent beef, well marbled, but they do not arrive at maturity till five or six years of age. They have all the magnificence which belongs to size, yet they are not so remarkable for milkers in proportion to size as some other breeds. They are almost invariably brindled, having alternate long black and red lines extending up and down over the body. These cattle furnish a large proportion of the best beef of Paris.

The latter, the cattle of Auge, are not quite so large but are equally beautiful. They are dairy stock, not good for much for work, but easily fattening, and that too, young. At three and a half or four years they may be sent to the butcher. The cows have made the fortune of Normandy by the quantity and beautiful quality of their dairy product. Any country that can surpass Normandy in butter and cheese may pride itself, with justice, upon its high agricultural position.

The color of the cattle of Auge is varied and mixed, sometimes red, sometimes white, sometimes black, often with these colors mingled, and often with a coat like the Bretons and the Dutch. Many maintain that these cattle came from the same source as the Dutch. They are still called Dutch by many farmers.

North of the region grazed by the Normans, just mentioned, is the country of the Flamands, a highly important race of dairy cows. They are pretty generally spread over the department Du Nord, the Pas de Calais, &c., and are so highly prized that many are to be found in the dairies around Paris. I saw them at the imperial dairy at Vincennes, near Paris, in competition with the Swiss, the Ayrshire and others.

It may be remarked that the Dutch have been largely introduced and mixed with the cattle of Belgium and the north of France, and many of the established breeds or families show evident signs of a connection, not very remote, with the marsh races already alluded to.

The Flamand cow is generally red with more or less brown, sometimes marked with white. It is found in its greatest purity around Dunkirk, and so on through Hazebrouck and Lille. This is a region of great drained marshes, dyked in like those in Holland. The pastures are shaded and rich, the cultivation of the highest character. I passed through a part of this rich section in July, when the crops were waving in every field with the utmost luxuriance, wheat covering a large extent, fields of poppies of many acres in extent in full blossom. There are no fences here. The view is unobstructed except by the magnificent shade and ornamental trees, of which there are immense numbers, and of course the cattle are soiled for the most part, though tethered out in many cases, and never turned out, as with us, in large pastures.

The Flamand cow is a fine dairy animal, rather above the medium size, ranging from 1,000 to 1,250 pounds live weight. The head is fine, the muzzle pointed, the horns squarely set, fine, projecting forward, but turned up at the points, white or yellowish and black at the extremities; the ear is delicate, the eyes black and sparkling, but of mild expression. The back is long and straight, the neck long and fine, the dewlap small. The folds of the perinæum are soft and yellowish and marked according to Guénon's system as flandrine. The shoulder is a little flat. This is essentially a dairy race, though the adaptation for beef is evident enough.

Around Lille, it is apparent that many crosses have been effected with the Dutch bull; the agricultural society of Valenciennes, also, have imported several bulls from North Holland for the purpose, but it is thought by many to be questionable policy to introduce Dutch blood, rather than breed from well-selected animals. The milk of the Flamand is almost as abundant, while the quality is richer. It is thought by some that the lymphatic constitution of the Dutch cow makes her a little more liable to certain morbid affections, which do not exist in the Flamands, while she consumes more than the Flamand.

Many crosses with the Shorthorn have been taken, but lately the preference is given to the Ayrshire cross. The first or Shorthorn cross adds nothing to the already high dairy qualities of the Flamand, the result being chiefly a little more rounded form or slightly greater tendency to fatten, but in neither of these points is this race deficient. The Flamand cow fats easily when not in milk.

It is pretty well established in France that the dairy cow is the means by which forage crops, all kinds of fodder, in fact, are transformed into human food with the greatest economy, and hence their breeds are generally better adapted to the dairy than to the production of beef. Their policy is in some respects the reverse of that of the English breeders, who recognize the production of beef as the leading object, and in this line they have met with eminent success.

The horses on the ground were numerous, and of course attractive, the number of entries being 513, of which most of the animals were exhibited. They consisted of thoroughbreds, Arabians and half-breds, while the English farm horses, the Suffolk, and horses of a similar character bred on the continent were represented by large numbers. An Arabian of Mecklenburg, twenty-nine years old, took a prize of 200 thalers. He was a very perfect animal at all points. The second prize Arabian was ridden by Lord Raglan in the Crimea.

The king of Hanover had many fine riding horses on the ground, and so also had the king of Würtemberg. These formed an exceedingly attractive feature of the show. They were on exhibition merely, and not entered in competition.

In the class of farm horses, many of the prizes went to the English Suffolks. A fine three-year-old Clydesdale, from the royal farms at Windsor, took a second prize of 50 thalers. Among the French horses in this class the Percherons took the lead. They are large and extremely useful animals.

Proceeding now to the sheep-pens, there is work for some full days, if one expects to get a complete notion of the sheep of the various sections which they represent. The show of Merinos, in particular, was without doubt the most extensive and most magnificent ever before made. They stood first in the catalogue, first on the grounds in respect to aggregate number, and among the most attractive to the large number of sheep-fanciers there. It was easy to see that fine wools were the order of the day on the continent, most of the long wools coming from England.

It was evident, too, I think, on a general look over the fine-wool classes, that there has been a gradual increase of size of body as well as of weight of wool. This may be owing to a more careful selection, but is most likely due to increased care and attention. There is, proportionally, a greater adaptation to mutton, in which the Merinos have always been admitted to be so deficient. If the breeders of fine wools can produce a more profitable carcase, without at the same time lessening the value of the fleece, they will deserve the thanks of mankind.

I suppose that Saxony and Silesia hold the first rank at the present time in point of relative amount of fine wools produced in European countries.

The introduction of pure Merinos into Saxony many years ago, gave that country an early preëminence in the production of fine wool, while the skill and care with which they have been bred, the favorable climate, the sweet, hilly pastures, and other circumstances, brought their flocks to a high degree of perfection, which they have maintained against all competition, unless we except the few skilful and successful breeders of Vermont and other sections of our own country.

Three royal sheep-folds were established in the Saxon Switzerland, as the beautiful and picturesque mountainous region along the Elbe above Dresden is called, and annual sales of breeding rams were instituted as a means of improving the stock of the country, while the necessity of a constant resort to the original source being early recognized, resulted in a great uniformity of type throughout the flocks.

The quality of the Saxon Merino wool is too well known to need description; the weight is not generally large, but the wool has a good average length, the staple is strong and fine, and the size pretty uniform on various parts of the body. In the form of the body the high-bred Saxon Merino is superior to most of the types of this animal found elsewhere. The enormous horns, the sharp foreheads, the dewlaps and folds of the neck, the length and size of the feet, the straightness of the chest, the projection of the shoulders and the length of the sides, which are serious defects in many classes of Merinos, and which no doubt contribute much to predispose them to diseases which carry off many, have been to a large extent corrected in the Saxon flocks. The head is smaller and more conical, the neck is short and free from folds, the skin is quite tight, the chest good, the shoulders well squared above, the sides round, the body cylindrical, the legs not too long.

It will be seen that the form of body indicated above gives evidence of a better adaptation to mutton-producing qualities than the general character of Merinos would lead us to expect, and I must confess that my impressions of what a Merino was capable of doing in this respect were somewhat changed by the full and well-rounded forms of the sheep in the Saxon, Silesian and Rambouillet classes, at the exhibition, and the fine flocks of these animals which I saw grazing on their native pastures. In point of fineness of wool, probably the flocks of Prussia are nearly, if not quite equal to those of Saxony, but they did not strike me as quite so well made as a whole, while the size is not generally quite so large, owing perhaps to the poorer pastures, and a want of that short and sweet mountain feed, more common farther south. Still, the spirit of improvement has long reigned among the flock-masters of Prussia as well as elsewhere, and this everywhere leads to increased skill. It is well known that the flocks in Saxony, Silesia, Moravia, and neighboring fine-wool-growing countries, receive extraordinary care, and attentions unheard of in many other countries. Men devote their lives to the business of shepherds, and the number of sheep under the care and control of each is not so large as to prevent his personal attention to all of them. This number ranges from 60 to 80 ewes sometimes, but seldom more than that.

The prominence given to sheep-husbandry in Prussia has led to the necessity of increased attention to forage culture and roots, which are produced in great abundance. This has necessitated the most abundant supplies of manure, and the greatest care and attention to its intelligent application. It is not too much to say that the introduction of fine-wool husbandry into Prussia, first undertaken by Frederic II. in 1748, but without success, again attempted in 1785, from which time the Merinos appear to have worked their way very gradually into favor, has increased the wealth of the country incalculably. Two thousand Merinos were bought in France in 1815 and '16, for the royal sheepfolds of Frankenfeld, near Berlin, and Panthenan, in Prussian Silesia. Annual sales of bucks at high prices distributed fine wools over the country, while as early as 1822 a club of 36 great land proprietors bought largely in Saxony, and also imported 1,200 ewes and 400 bucks from Spain. The royal flocks did not meet with eminent success, on account of a serious disease which broke out in the sheep got in France, and which carried off large numbers; still the sales of animals and the general spread of the enthusiasm for this branch of farming had already accomplished important results.

We are too apt to limit the effect of such enterprises as the importation of improved stock, or to judge of it by the aggregate number of animals attained, while we overlook the more or less general awakening of the spirit of improvement attending it, and which radiates out in every direction through the community, so that the aggregate result to the wealth of a country can only be measured after a considerable lapse of time, and when we can fairly estimate the general stimulus given to the community by such public-spirited efforts.

In Prussia, one successful attempt was followed by another. The club, already alluded to, held exhibitions. High prizes were offered for the best bucks, quite equal in importance to those offered for the larger animals, cattle and horses. Other associations were formed in other parts of the country, and in order to make sure and rapid progress in the improvement of the sheep of the country even among the peasants, some associations were organized to furnish a certain number of bucks without cost each year. In 1836, ninety-seven rams were thus placed, in 1839, eighty-nine, and so on.

It will be inferred from a mere allusion to these facts, that the efforts to improve the flocks of the country were neither limited nor spasmodic, as they were about the same time with us. They were on a gigantic scale, encouraged and promoted, from the king down, through a long series of years; so that we need not be astonished at the wealth and prosperity which this branch of farming has secured to Prussia. Wool markets are established in various cities and prominent towns to facilitate sales. The most important of Prussia, probably, is that at Breslau, in the province of Silesia, held from the 2d to the 7th of June and on the 2d of October. But there are several other very important points.

The high reputation of the Merinos of Austrian Silesia is well known. They have been bred there in great perfection for many years, as well as in the adjoining country of Moravia. Most of the nobility and the great landed proprietors are largely engaged in the production of fine wool. The peasants, on the other hand, still stick to the "old natives," or the common sheep of Germany, while the settlers on the other side of the Carpathians keep the Hungarian sheep, called there Zakels, of a long and coarse wool.

The Merinos first introduced into Austria came from the most celebrated flocks of Spain. It was towards the close of the last century that they were first naturalized there, chiefly through the efforts of the Empress Maria Theresa. Many pure bred and vigorous animals, of very fine, soft fleeces, soon found their way into the hands of private individuals, and thus gradually this important industry grew up to almost gigantic proportions. The pretty general spread of fine wools over the great estates of Silesia, and their intelligent treatment there, date from the first ten years of the present century. The growing of fine wool was taken up with enthusiasm, the landholders becoming passionately fond of it. Exhibitions were held annually, first organized by the Imperial Society of Agriculture for Moravia and Silesia, at Brunn. The improvement of Merinos, under the stimulus of the excitement and profit, was carried to the highest degree of perfection, and these countries soon took the first rank of nations producing fine wools, and their fleeces soon compared in fineness and beauty with the finest products in Europe. The revenues of the country, both for wool and in sales of breeding animals, became very large.

The peasants who kept the common sheep of the country, soon began to improve them by crosses with Merino bucks, and the production of short and coarse wool greatly diminished. But the Zakels, on the side of the Carpathians, still maintained their ground and exist in considerable numbers to this day. The butter used by their frugal owners is made from the milk of these sheep, but large quantities of this milk are made into a very excellent cheese, called *brinsin*, which is sold in considerable quantities. The whey is used by persons suffering from pulmonary complaints.

I passed through these countries in 1862 and alluded briefly to their agriculture. The flocks are generally kept at pasture as much as the season permits, but are kept up during winter and fed on hay, straw, cut clover, potatoes, turnips, &c. The bucks receive a few oats for a few weeks in the fall, and the ewes have, in lambing time, more or less crushed grain, bran, or meal, moistened in water. In the most noted flocks the lambs come in summer. The average quantity of wool per head of Merinos is about one pound and three-quarters. The total product of the two provinces, Moravia and Silesia, is nearly two million pounds a year. When the weather is suitable the wool is washed on the sheep, suitable troughs or basins being made for the purpose. Very fine bucks sell for from $75 to $150 a head, but often bring a far higher price if particularly fine woolled. Ewes bring from $10 to $20, if very fine and rich in wool. Bucks are used for breeding at three years old, ewes in their third year, and sometimes, if very robust and well developed, still younger, and they are kept for breeding ordinarily four or five years.

Not the least interesting feature of the show of fine woolled sheep were the specimens from the celebrated Imperial flock of

Rambouillet. They were fine representatives of the present condition of French Merinos. I took occasion, while in France, in the month of August, to visit that establishment, introduce myself to Baron Daurier, the intelligent director, who very cordially conducted me himself to all parts of the buildings and showed me the mode of management, and each flock in turn, classified according to their ages. The Baron subsequently placed in my hands the following note, in manuscript, which I translate :—

### THE MERINOS OF RAMBOUILLET.

The Imperial flocks of Rambouillet belong to the stocky variety, of which the largest and most perfect models are to be found in the establishment. In contrast with the light variety, which is of a slender build and high on the legs, the sheep of Rambouillet have much greater tendency to fatten. Their forms are perfect, they are low on the leg, of a strong body, and of a form rather round than long and flat. They are covered with a beautiful wool in square locks, soft to the touch, well laid on, (*tassée*,) finely notched, or curled and elastic. The legs, the hams, the belly, are alike covered with wool.

The fleeces are neither loose nor uneven. The locks composed of an equal wool have a direction always perpendicular to the part of the body from which they start. This prismatic form of a uniform size, moreover, presents upon the surface of the fleece, dimensions quite parallel to those which it has at the base. A considerable number of undulations are noticed upon each isolated staple.

The Merinos are distinguished, not only for the fineness and the valuable quality of the fleece, but also by a great quantity of wool in proportion to the size of the animal.

Long experience has proved that the Merinos of Spain, far from degenerating, are improved at Rambouillet, and that results are obtained superior to all those which the finest flocks of Spain present. Several qualities have been clearly developed, such as increase of size and with it the quantity and quality of the wool. It may be remarked that when the flock came to Rambouillet, in 1786, a great part of the animals had what is called "ham-strung," (*jarré*,) which has disappeared in their progeny as a sole effect of increased care. The Merinos form a race by themselves. The crosses may give animals more or less approaching the race, but never the same.

The size of Merinos is medium. They hold about the middle point, in respect to dimensions, between the small and the large races. They have large heads, flat noses, and wrinkled faces. The horns are thick, large, turned in spirals, and of great length. There are cases in which they have a spread of more than twenty inches.

Among the animals of the short-legged family some distinctions are kept up at Rambouillet, to satisfy the different tastes of amateur breeders. Certain animals have dewlaps, others, folds on the shoulders, the buttocks, and the neck ; there are others still, whose cheeks, the lower part of the jaw, and the forehead, are entirely covered with wool, which sometimes comes down over the eyes. By the choice of animals the breeder can maintain or efface these characters. There were, at Rambouillet, lambs eighteen months old having immense folds on every part of the body, of which not a trace now remains. These animals are magnificent and have abundant fleeces.

It was in 1785 that Louis XVI. bought of the Duke de Penthièvre the land of Rambouillet.

By orders of the king, a beautiful farm was made in the park, designed for such experiments, under his direction, as the various branches of rural economy and the breeding of cattle seemed to require, to prove to the public the interest which the sovereign took in that first of all arts and most important industry.

Louis XVI. wrote with his own hand to the king of Spain and obtained a remittance of valuable animals, which arrived at Rambouillet on the twelfth October, 1786, and was placed in the buildings which had been provided for it. Subsequently, and by order of the first consul, a second importation took place, under the care of Gilbert.

During the captivity of the king, and after his death, the flock several times ran the risk of being destroyed. Fortunately, some well-disposed minds caused it to be understood that it had not been merely the object of a royal fancy, and maintained with warmth how useful it was to the nation. In May and June of the second year of the Republic, some decrees of the committee of public safety, attached to which we find the names of Robespierre, Saint Just, Couthon, Collot, d'Herbois, Billaud, Varesme, Carnot, &c., ordered the preservation of the establishment of Rambouillet, and that it should be carried on at the expense and on account of the government.

In the fourth year of the Republic, they were upon the point of alienating the domain, but a decree of the Directory, executed on the 7th of Messidor (26 June) of the same year, excepted the park of Rambouillet from the sale of public properties ordered by the law of the 28th of Ventose (18 March.)

After the Consulate and the Empire, the flock of Rambouillet had still new dangers to run, and new attacks directed against it to resist. In 1814, M. Bourgeois, director of the farm, saved the Merinos by concealing them in the forest of Anet, situated near the Dreux, and in 1815 he resorted to subterfuges to prevent Generals Blücher and Bulozz from seizing it. In 1832, some intrigues and secret steps were taken for the suppression of the rural establishment. They were credited by the administration, and had such an influence that a decision was made, to announce publicly a sale of the flock on the 1st of June, 1833. The friends of agriculture protested most strenuously against such an act of vandalism. It required the influence of many large proprietors and the objections of the agricultural societies, to cause this decision to be revoked.

A little while after, a decree of the king, made in council of ministers, the 8th of Jan., 1834, pronounced the preservation of the flock as the original type of the most beautiful Merino race, destined still to add to the agricultural glory of France.

In 1848, M. Elysée Lefebvre, then the director, heard some talk of the destruction of the establishment and the suppression of the flock as a thing wholly decided upon. He went to Paris, showed to the minister, M. Bixio, that this suppression would be very much to his discredit, and that to turn the flock over to the public would be to lose completely the purest blood of this beautiful animal, because all breeders would do as has hitherto been done; that is to say, take crosses. The minister immediately concurred in the just observations of M. Elysée Lefebvre, and the decision was revoked.

In 1849, the question was seriously agitated of removing the flock to the National Agricultural Institute of Versailles, then created by the government on the proposition of M. Chouret. On the subject of removal there were new protests. The council of the city of Rambouillet, on the 13th July, 1849, unanimously resolved that it was for the public interest to keep the flock in the great park of Rambouillet. The Central Agricultural Society of Paris hastened to present a vote to the minister upon the objections to the intended removal.

In 1854, the idea was suggested to the Emperor of sending the flock to Sologne or elsewhere. Her majesty did not fancy this proposition, and went in company with M. Fould to visit the Merinos, and condescended to take the establishment under her august protection. By her orders, great improvements were made. Napoleon I. built a long range of sheds in a wing. Napoleon III. has built a second wing. Now the arrangement and every thing about the buildings is pretty complete.

It is admitted that the flock ought to remain where it is. It prospers there, has wide ranges and favorable shade, and no dust. A perfect enclosure prevents the possibility of contamination of blood and contagious diseases. Carried elsewhere it would no longer be the flock of Rambouillet. It would cease, as has been judiciously observed, to exist in name and in fact, because it would lose its renown and its influence. The farm of Rambouillet alone can preserve it.

Thus has it been kept through all the changing regimes of France.

With such an imposing array of sheep, about two thousand in number, selected from the first and most improved flocks in Europe, it was a source of gratification and pride to every American, that we had any at all to show, and that the twelve from Vermont were so far superior to the best representatives of Saxony, Silesia and France, those nurseries of fine wool, as to bear off two first prizes and one second prize, and that, too, with a large competition in the same class. The award was understood to be a unanimous one, the judges each representing different nationalities. The owner of these sheep, Mr. George Campbell, sold them, after the exhibition, for one thousand pounds sterling, to go to Silesia.

Governor Smith, of Vermont, in his address to the legislature, thus alludes to this success:—

"Among other products taken from Vermont by the commissioners for exhibition, were twelve Merino sheep; and I am happy to congratulate the State upon the success which attended the enterprise. In the list of competitors for prizes at the exhibition were two thousand sheep, representing the best flocks from all the German States, from France, England, and nearly all the countries of Central Europe. Against this strong competition, and contending against the natural prejudices existing against American products, Vermont won, at the hands of an able and impartial board of judges, the two first prizes, and one second prize, for her sheep. The result of this to the sheep-breeding interests of Vermont can hardly be estimated. It was a great achievement, and is destined to give to America, and especially to Vermont, that which Europe has for so long a time almost exclusively enjoyed—the rich and valuable trade in stock-breeding sheep."

The award created no small surprise in the minds of many, and led to a very careful examination of the sheep, in comparison with the other fine-wool entries, but I think any impartial judge was ready to admit, that the staple of the American fleece, if not quite so fine as the finest of their competitors, was longer and cleaner than any of them, leaving much less chance for loss in shrinkage, while the size of the sheep, not so large as some others, was, neverthless, more suitable for the production of a uniform and even fleece. The strong point of superiority was the remarkable evenness and purity of the fleece.

This triumph was of great importance to the whole country. It will stimulate and encourage our breeders to further effort and higher triumphs in the future, and thus promote the wealth and prosperity of the country.

Of the swine on the ground I have but little to say; not that I failed to examine them with some care, but that the finest specimens were mostly either shown by English exhibitors, or if otherwise, they consisted largely of English breeds or their descendants, and these are alluded to in considerable detail in my last annual Report. The show was extensive, and as attractive as such shows generally are. Fat carried the day. Fat will cover faults; melancholy fact! Being very hungry on one occasion, I saw what I took to be a very fine, round sponge-cake. It was soon mine; but what was my astonishment and disgust, when, on trial, it proved to be a fat pork-pie.

The chickens and other poultry promised a more savory dish, and I paid what attention I could to that department. I do not remember to have seen any thing very remarkable or superior to many of the breeds to be found among us. A national show in the United States would, I think, appear more striking in this division.

The implement department was admirably arranged and magnificent in extent, with ample space for machinery in motion. It consisted of locomotives, movable and stationary steam-engines, steam-ploughs, and in fact of all kinds of farm implements. Some idea may be formed of its proportions when it is stated that three thousand machines and farm implements were on the ground, and among them seventy-five steam-engines, representing every variety, many of them of immense size and power. The collection included, also, five hundred ploughs.

The machinery of Great Britain was, of course, largely in the ascendant. Her ponderous steam-ploughs attracted great attention and received a liberal patronage. Five steam-ploughs were entered, each cutting three or four furrows in a satisfactory manner; but I have nothing to add to my remarks on them in my last report. The Hon. Joseph A. Wright, Commissioner on the part of the United States, in his report upon the exhibition to the President, says of them:—

> "I was convinced that if some modification could be made by which the expense attending the machinery for this operation could be materially diminished, the introduction of ploughing by steam could be easily effected, so as to be highly advantageous to the agricultural interests in many portions of the country. It is most manifest that steam is designed to play an important part in many of the branches of agriculture. In the opinion of your commissioner, we have not been sufficiently mindful of the progress made in Great Britain and other portions of Europe in the improvements of agricultural implements brought about by the sharp competition of the English manufacturer for the European market.
>
> "We are content with our unparalleled success, and we may well say we are ahead of the nations of the old world in machinery, in its adaptation to the wants of the people, in cheapness and utility in the great labor-savings machines of the day—threshers, mowers, reapers, grain-cleaners, &c., &c. Yet a few days' witnessing the steam-ploughs and

steam-machines in operation upon the national fair ground at Hamburg would induce you to say, we are behind many of them in the application of steam to agricultural work. Whatever the wants of the present day may be, the time is not far distant when many portions of our country will require this wonderful element; if we shall fully develop the hidden resources of our rich but diversified country. So important did the exhibition of the steam-plough appear, that a partial promise was procured from an eminent English firm to attend the first national agricultural exhibition in the United States with their steam-ploughing apparatus, if an invitation should be extended to competitors in this mode of ploughing."

But, though we had nothing to show of this class, we made a better figure in the class of reapers and other implements. And here again I can hardly do better than to quote from Gov. Wright, who says:—

"After a most thorough examination, trial, and practical test, before a committee of distinguished and competent gentlemen, representing eleven nationalities, and amidst a host of competitors, we maintained our complete ascendency in reaping machines, the greatest of labor-saving machines in cutting the staff of man's life—*bread.*

"The golden medal was awarded to C. H. McCormick, of Illinois, whose splendid reaper took the like reward at the London exhibition. This machine surpassed, in elegance of workmanship, any agricultural machine on the ground, while his working machine at the trial only more fully demonstrated and confirmed the superiority which he had so long maintained in Europe and in America. The second prize for a reaping machine was awarded to a citizen of New York.

"Twenty-five medals and diplomas were awarded to American contributors; there was also a complimentary testimonial presented to each of the States represented, a large and beautiful Hamburg flag.

"Although the contributions from the United States were few in comparison with those of other countries, yet those present attracted great interest from the thousands who thronged the grounds, to whom our implements, household articles, and agricultural inventions were generally unknown. A crowd could be found at all times examining the American contributions, and orders were given for duplicates of hundreds of them. Those present were sold.

"The great majority of our articles, especially our farm implements, are well adapted to the wants of Northern Europe, and the prices at which they are manufactured enables us to compete successfully with the foreign manufacturers. It is to be regretted that our people did not take more interest in this international exhibition. Never was there such an opening for American skill and industry. Here American manufacturers and mechanics had opened to them, in the *house of their friends*, the opportunity of presenting their inventions, skill, and products direct, and free from those embarrassments so frequently attending former exhibitions in other portions of Europe, surrounded by those who are bound to us by so many ties of friendship and consanguinity; those devoted, wherever they go, to agricultural pursuits; those who cultivate the immense agricultural districts stretching from the Rhine to the Danube, from the Baltic to the Mediterranean.

"The exhibition of American machinery and implements received a great accession from a most liberal donation from several of the leading German merchants, bankers, and citizens of the city of New York, including a complete assortment of agricultural implements. These, with the premium reaper contributed by Mr. McCormick, in connection with many articles from other American contributors, are to form the *nucleus* of an *Agricultural Museum*, to be established in Hamburg. This I regard as the most gratifying result attending this international exhibition to American interests.

"Several thousand dollars were subscribed, before I left Hamburg, for this object, and doubtless it will be carried out by the well-known liberality of her citizens.

"The establishment of this museum or depot opens for all time to come, a place of deposit for American skill and products. Hamburg is the third city of trade and commerce in Europe. Hamburg is the key, not only to the great German mind, but the open doorway to more than one hundred and fifty millions of the people of Northern Europe. With Hamburg we have rapid and almost daily communication, and it is difficult to estimate the advantage which will accrue to our mechanical skill and industry, our manufacturers, our commerce and trade, by the location of a museum for their deposit in a city situated like Hamburg, whose merchant princes hold in their hands the immense trade of Prussia, Austria, Sweden, Denmark, portions of Russia, and the Slavonian States. *Trade and commerce invariably bring together men whose interests are affected thereby. Men will follow the fruits of their labor to market.*

"The case of Worthington & Co., of Jackson, Michigan, illustrates most forcibly the prospect held out to American industry at this great assembling of the men of labor. They sent forward one case of gardening and harvesting tools of the value of twenty dollars; such was their beauty and utility, they were sold upon being opened on the ground for more than thrice their value. There can be no doubt, if the small appropriation asked for at the last Congress had passed, so well calculated to call the attention of our people in time to this exhibition, thereby arousing a spirit of emulation, hundreds if not thousands of samples of our diversified mechanical inventions and manufacturing skill would have been upon the ground, and the foundation laid for a trade of hundreds of thousands of dollars. No American could walk over the ground and witness for himself the crowd and the articles on exhibition without wishing for a larger number of our inventions and productions to exhibit side by side with those around him. All seemed to regret we had not our substantial farm wagons and carts, our carriages and buggies, our horses of speed and strength, cur large work oxen, and other productions to show the thousands thus assembled the growth, skill, and energy of the men of the New World."

Although the American department was not so well represented as we should have been glad to have seen it, still it was quite respectable, and, as intimated above, quite as attractive as any other part of the fair. It drew a constant and pressing crowd, all interested in the smaller farm tools, especially. In hoes, shovels, forks and rakes we could have made a magnificent display, and I saw no axes to be compared with those of our own Douglas Axe Company.

"In a commercial point of view," says Gov. Wright, "many advantages are anticipated from our connection with this great international exhibition. The strong sympathy which has been awakened, and the long existing friendship which has been strengthened towards the people of the United States by the interest manifested by the Chief Executive officer of the States collectively and the several States, in their efforts to promote the agricultural industry of the world, will far outweigh, at a time like this, all other advantages.

"It was most manifest that the great German Empire, with which we formed an early treaty of friendship and commerce, and with which we have maintained unbroken relations of peace from the days of Washington, regard our troubles with intense solicitude.

"The presence of the American delegates and our inventions and products on this occasion was well calculated, not only to promote the material interests of both countries, but to bind together more closely the long existing peaceable relations.

"We found everywhere an ardent sympathy for the restoration of law and order—for our triumph, for the unity of our country. This feeling was most manifest among the friends and relatives of our adopted citizens in the fatherland.

"It was not thought possible that we could succeed in achieving any triumphs at this exhibition in the present unhappy condition of our country; hence there was a *moral power* attending our success, as it displayed most visibly the energy of our people, the resources of our country, the confidence in the future of our government, and was well calculated to cement more closely the bonds of existing friendship."

A large part of the success of this exhibition, so far as this country appeared in it, was due, it is but justice to say, to the efforts of Gov. Wright and Austin Baldwin, Esq., of New York, whose efforts to have the country respectably represented were untiring and deserving the acknowledgment of every American.

The American delegation was very cordially received. Eight of the States were represented by Commissioners. These were Connecticut, Illinois, Indiana, Massachusetts, New Jersey, New York, Rhode Island, and Vermont. Other States appointed commissioners, who were prevented from one cause and another from attending.

The following is a list of premiums and awards to the American exhibitors at the Hamburg Fair, July, 1863:—

George Campbell, of Westminster, Vermont, for twelve sheep, two first-class and one second-class premiums, $150.

C. H. McCormick, Chicago, Illinois, reaper; one large gold medal and diploma.

Seymour, Morgan & Co., Brockport, New York, reaper; silver medal and diploma.

Thompson & Avery, Tinckhammock, Pennsylvania, threshing; silver medal and diploma.

John Kelsey, Yardleyville, Pennsylvania, harrow; bronze medal and diploma.

John Vanderbilt, New York, assorted agricultural implements; medal and diploma.

J. W. Free, Goshen, Indiana, fanning mill; medal and diploma.

Solomon Hubbell, Unadilla, New York, seed-sower; medal and diploma.

James A. Gaxton, Canton, Ohio, reaper; medal and diploma.

Whittimore, Belcher & Co., Chicopee, Massachusetts, ploughs and straw-cutters; medal and diploma.

R. H. Allen, New York, agricultural implements; bronze medal and diploma.

Hall & Spiel, Pittsburg, Pennsylvania, plough iron; bronze medal and diploma.

E. A. Tampton, Worcester, Massachusetts, wood machine; bronze medal and diploma.

J. Redstone, Indianapolis, Indiana, shingle machine; bronze medal and diploma.

Wm. D. Windle & Co., New York, domestic utensils; bronze medal and diploma.

H. G. Hotchkiss, Lyons, New York, essential oils; bronze medal and diploma.

Hall & Parshall, Lyons, New York, essential oils; bronze medal and diploma.

B. P. Johnson, Secretary N. Y. N. S. A. S., Albany, New York, seeds; medal and diploma.

Sylvanus R. Ward, New York, anthracite coal; medal and diploma.

Geo. Campbell, Vermont, turnip-cutter; medal and diploma.

R. M. Rhodes, Baltimore, Maryland, turnip-cutter; medal and diploma.

Duryea, New York, maizena; bronze medal and diploma.

J. Johnson & Co., New York, washing machine; bronze medal and diploma.

During my stay in Hamburg, I took an opportunity to visit the celebrated nurseries of the Booths, at Flotbeck, a few miles below the city, in Holstein. Holstein, in fact, begins at the gates of Hamburg. Altona, one of its largest and most flourishing towns, is, to some extent, a rival of its more pretending neighbor, from which it is scarcely a mile removed. The road through Altona to Flotbeck lies along the high left bank of the river, here lined with gardens, orchards, groves, and pretty villas with their parterres of flowers, all displaying taste and luxury. The majestic river is studded with green islands; the low and level country of Hanover lies opposite and gives a widely-extended view.

These nurseries are among the most noted in Europe. They are so arranged as to unite the practical with the ornamental, that is, the ornamental trees are arranged in lawns to show how they will appear in a gentleman's park, while specimens of them are for sale in the nursery. The collection of plants of all sorts and varieties is immense. Long ranges of greenhouses were filled with flowers and tender plants. An endless stream of visitors kept coming and going, the number no doubt greatly increased on account of the Fair. The prices of very many of the plants appear rather higher than at the celebrated nurseries of Van Houtte, at Ghent, which I had previously visited.

Near by, there is a large place devoted to the production of seeds for the market, where nearly everything that there is any demand for is raised, while not far off, near the bank of the river, stands the monument of the pious poet Klopstock, who did so much to establish the permanence and character of his beautiful German language. "If poetry had its saints," said Madame de Staël, "Klopstock would certainly be reckoned among the number." His poetry is associated with all that is grand and majestic. Patriotism and religion were its living elements. Homer, Pindar, Milton had no greater. Original, lofty and grand in the treatment of the high themes which filled his soul, he led his contemporaries and followers to a higher aim for German literature, than servile imitation. The language into which he threw so much soul and power as to reach the deepest recesses of the German heart, furnished a fitting medium for the noblest works of Wieland and Lessing, so soon to be adopted and perfected by Goethe and Schiller, the greatest lights of their age and country; but to none with so much truth as to Klopstock can the title of Father of German literature be applied.

The Messiah of Klopstock probably did more than any thing else to mould and form the language, because it first showed its unbounded depth and power and fervency. The influence of the poet was felt from one end of Germany to the other, his singularly beautiful and touching odes reached the heart of the people, and finally, when he was borne to his grave from this commercial city, all classes sincerely lamented him; the shops were closed, the colors of the shipping were lowered, the bells of the city were tolled, and funeral dirges were sounded by trumpets from the steeples of the churches, while upon his bier was laid a copy of his noblest work, the Messiah, in a wreath of laurel, and the ceremony was closed by a choir of young girls dressed in white strewing his tomb with flowers and chanting his Ode to Immortality.

Another point of interest was the Zoölogical Garden, conveniently located just at the outskirts of the city. Though only about fifteen months old, it is extremely attractive and full of instruction. This enterprise owed its origin to the public spirit and untiring energy of Baron Merck. The transformation of a sandy desert, as it is described to have been previous to the location of this garden, is quite wonderful when the time is considered. It now wears the aspect of a beautiful park, with its lakes and hills, its rocky grottos and alpine peaks, all filled with a large and attractive variety of birds and animals collected from all parts of the world. Though still small, of course, and ungrown, the general arrangement of the trees and shrubbery is excellent. This is destined to become one of the finest zoölogical gardens on the continent, a place of resort not merely for amusement, but for instruction in natural science, and important as cultivating a correct taste in the public. The grounds comprise many acres and the specimens many thousands.

I had previously visited the Zoölogical Garden at Frankfort-on-the-Main, and those at Ghent, Dublin and other cities. That at Frankfort was started as a joint stock company, and has not only been self-supporting, but decidedly prosperous, notwithstanding the fact that the cost must have been very great, owing to the extent and magnificence with which the whole is laid out. The director took great pains to show us all parts of the immense establishment, comprising many acres, consisting of ponds and lakes, islands, groves and hills, and thousands of birds, animals and reptiles. The week previous to our visit there were more than thirty thousand visitors to this garden, and the receipts were more than six thousand dollars.

Why should not Boston and other American cities exhibit the same public spirit as the cities of Europe? We have the means, but we are far behind many, in fact, most of the European cities, in this respect, and in open parks and squares and pleasure-grounds. We are not apt to look forward, to anticipate the wants of the people of a great city. We have nothing that can in any way compare in beauty, and taste and finish, to say nothing of extent, with the magnificent Alster Basin at Hamburg, and the public shaded promenades around it. We have no promenade to be at all compared with the splendid ornamental grounds along the Danube in Vienna, and we have forever shut out the possibility of it, by allowing long ranges of brick and mortar houses on the outside of the Mill-dam, when a reasonable public expense would have transformed it into the grandest promenade in the world. It is melancholy to see such opportunities thrown away, but their importance will appear, sooner or later.

In one respect, fortunately, we can justly claim a vast superiority over most European cities, and that is, in our rural cemeteries. This point of difference was especially impressed upon my mind, from the fact that my travelling companion through Ireland, England, Belgium and Germany, as far as Hamburg, was Mr. A. Strauch, the Superintendent of Spring Grove Cemetery, Cincinnati, the finest, probably, all things considered, to be found in the United States. With him, I visited the cemeteries of every city on our route, and as I had previously seen most of the well-known cemeteries of our American cities, the comparison was easy. But I defer, on this point, to Mr. Strauch, whose intimate knowledge of the subject constantly aided me. He says, in a recent communication :—

> "Neither London, Paris, nor Berlin, with their splendid public parks and gardens of thousands of acres, has at this time a rural cemetery that could compare with any of the principal cemeteries in the United States, in extent and keeping.
>
> "As regards monumental decoration, it must be admitted that the burial-places of London and Paris possess great works of art, but their number is not so large as might be expected, and the great bulk of the monuments erected to the departed would admit of considerable improvement. The great mistake lot-holders make there, as well as here, consists in attempting to do too much, whereby they destroy the general good appearance of those beautiful locations usually selected for the burial of the dead. We should always remember that simplicity is the foundation of true beauty, and is applicable to rural burial places more than to any other spot."

When in Paris, in the month of August, I visited Père la Chaise, the great receptacle of all classes of citizens. It was a visit full of melancholy interest, not only on account of the many tombs of those whose names are familiar in history and poetry, but more on account of the manner of burial of the poor. Several interments of these unfortunates took place while I was there, and I saw more than one heart-rending scene which I can never forget.

The tomb, at best, in that celebrated city of the dead, is but a temporary resting-place. Many of the most expensive monuments are inscribed *in perpetuité*, but even these are liable to give up their dead long before it was intended they should, while the great majority can rest but a few years at most, when they are rudely thrust aside for some new comer, who, in his turn, will give up his place to others in rapid succession.

Now I am on this subject I will quote again from my friend Strauch in regard to this, and other similar locations, most of which I also visited with him :—

"The Cemetery of Père la Chaise was purchased in 1800 by the municipality of Paris, to form the first national burial ground. It was consecrated in 1804, and contains at present one hundred and twelve acres, with over one million of interments. It is calculated that over one hundred million of francs have been expended in the erection of monuments to the memory of the dead ; many of them are, however, disfigured by ridiculous inscriptions and other ornamental puerilities. And considerable difference of opinion prevails concerning the taste displayed in the burial grounds of Paris, which form a striking contrast to the magnificent parks and gardens recently constructed, as well as all other improvements, in this great centre of civilization. The visitor to Père la Chaise will find the graves of the greatest men connected with the arts, sciences, literature and the armies of modern France.

"The Kensal Green Cemetery, near London, was established in 1832, by the General Cemetery Company, after years of violent struggles with those individual interests which always impede a social reform. It now contains seventy-seven acres of stiff clay soil, and is divided into two parts. The larger division is under the protection of the Church of England, and is adorned with costly monuments of some of the first families of the United Kingdom. The smaller part is unconsecrated, and reserved for the performance of any burial ceremony the various religious opinions of different persons may demand. Both parts, however, are provided with chapels, beneath which are extensive catacombs. The colonnades for the erection of tablets to the memory of those whose remains rest below, are spots where the visitor will find subjects for meditation. In this cemetery are buried the remains of H. R. H. the Duke of Sussex and the Princess Sophia. This was the first time in the annals of England that a distinguished member of the royal family was laid, by his own desire, in a burial place with the people. Here are also to be found the tombs of Allan Cunningham, J. C. Loudon, and others.

"The Cemetery of Frankfort-on-the-Main contains about sixty acres, with thirty-two thousand interments, and is entered by an open colonnade with two wings, the one of which is the residence of the overseer, and the other is used for the deposit of bodies in coffins previous to interment, as a precaution against premature inhumation. There is also a large waiting-room, for persons who accompany the funerals. The monuments, with the exception of a few, are not very remarkable.

"The cemeteries near Hamburg, Berlin and Dresden belong to the different churches, and possess nothing worthy of the artist's or the poet's observation. The nobility have their mausoleums in their own private parks, isolated from the common people; the most splendid of which is the chapel erected to the memory of the Duchess of Nassau, near Wiesbaden. A still more costly structure is in progress of erection in the cemetery at Laken, near Brussels, for the late Queen of the Belgians. The mausoleum at Charlottenburg, near Berlin, contains the remains of the late king Frederick William III. and his beautiful queen Louise. Both are sculptured in marble by the master hand of Rauch. The burial place of the Humboldt family is at Tegel, a few miles from Berlin, and the grave of the immortal Alexander is by the side of his brother William, and covered with ivy. The family monument is a red granite column, surmounted with a white marble statue, and surrounded by evergreens.

"The cemeteries of Edinburgh and Leith are small, but all of them exhibit visible tokens of improvement, extending itself to the graves. This is seen in the neatness of the cut grass, the trim walks, and above all, the good taste displayed by the sextons in preventing any scattered bones of the poor deceased to be seen about the graves, when an interment takes place, which is not the case in many other graveyards.

"The principal burial ground of Dublin, is the Prospect Cemetery, at Glasnevin, in the vicinity of the Botanic Gardens. It is under the control and supervision of the Roman Catholics, who, however, permit other religious sects to be interred within the same inclosure. The most remarkable monument in these grounds is a large round tower, erected to the memory of the late Daniel O'Connell, the great Irish patriot. The tomb of Curran is also here. The avenues are narrow, and no carriage is permitted to enter the grounds, which are kept very clean, and adorned with shrubs and flowers; the soil, however, is retentive of water, and, therefore, not so well adapted to a burial-place as a dry and sandy soil.

"The chief burial-place of the ancient aristocracy of Ireland is at Muckross Abbey, founded by McCarthy Mor, in 1440, on the borders of the Lakes of Killarney. It is probably the most picturesque and romantic burial ground anywhere to be found. Beneath the ivy-covered ruins of this ancient abbey are seen the tombs of its founder, McCarthy Mor, the O'Donohues, the O'Sullivans, and a large number of other eminent families. Thousands of people from all parts of Ireland, as well as distinguished English and foreign travellers, come every year to visit the tombs of their ancestors. A large yew-tree, with a trunk thirteen feet in circumference, and whose branches actually support the crumbling walls, forms a canopy above the open cloisters."

Among the many acquaintances made at the exhibition at Hamburg, few are remembered with greater satisfaction than that of the son of the distinguished agriculturist, Thaer. The name had been familiar to me for many years. Indeed, a farmer's library can hardly be considered complete without the writings of this great pioneer in agricultural instruction. Mr. Thaer, the son, is now quite advanced in years, the exact number of which I have forgotten, though he informed me in the course of a long and genial conversation about his earlier years and the reminiscences of his father—I should think about seventy-five, though he is still vigorous in body and active in mind. He is now living in Berlin and has a son, Albrecht von Thaer, who is professor of agriculture there.

Another distinguished agriculturist, whom I met many times and whose name was equally familiar to me, was H. W. von Pabst. He has held many prominent positions, among others, that of Director of the Agricultural Institute, at Hohenheim, and afterwards of Altenburg, in Hungary, but is now connected with the department of agriculture in the government at Vienna. I have been largely indebted to him for details of the peculiarities of many of the continental breeds of cattle exhibited at the fair. His work on the introduction to cattle-breeding is regarded very justly as high authority in Germany.

Many, perhaps I might say most, of the professors of the agricultural schools and universities were present and took an active part in the management of the exhibition, serving on committees, and as commissioners from their various governments. The exhibition, in fact, brought together nearly all the distinguished agriculturists of Europe. Thirty-four nationalities were in attendance, many of them largely represented. It is doubtful whether any occasion ever brought out so many characters prominent in agriculture. It lasted from the fourteenth to the twenty-first of July, and afforded ample opportunities for the purchase and sale of a great amount of stock and implements.

It was with almost a feeling of regret that I took the train for Leipsic on the morning of the twenty-second, for the purpose of visiting Thärand and the university of Jena. As good fortune would have it, Mr. von Thaer, on his way to Berlin, took the same train, and we occupied the same seat, so that I had another day of conversation with the son of the great teacher of Möglin. When our ways diverged in the afternoon, it seemed like parting with an old friend.

Seated again, and off through a level and rather an uninteresting country, much of it sandy, my travelling companions were changed, but the discussion was still upon the exhibition, showing clearly that they had, like myself, just come from Hamburg. We passed immense fields of poppies, still in full blossom, as they had been in Flanders and Belgium a fortnight or three weeks ago. Towards Leipsic the land is better and more highly cultivated than that we passed in the early part of the day. Vast fields of wheat, and rye, and oats, and fields of lupines and poppies, without end, line the road for many miles. No division fences. In fact, up to this time, I do not remember to have seen a division fence between fields from the time of landing at Calais, more than a thousand miles. The people on the continent can't afford the extravagance. The potato and the sugar-beet are very common crops.

My vis-a-vis was an intelligent-looking, wiry, gold-spectacled German, whom I soon found to be a secretary of an agricultural society of Upper Saxony. When I informed him that I served in a somewhat similar capacity, he very soon began to examine me in botany, asking the scientific names of the various crops we saw along the road, making it a serious business as if he might take it for granted that such a position implied a thorough knowledge of all the cultivated plants. When he found I could pass, he began to open his heart and to be more communicative, and although I had thought him at first the concentration of the pedantic, we afterwards passed an agreeable evening together in Auerbach's cellar, at Leipsic, and I was indebted to him for considerable information about the city, with which he was quite familiar.

The readers of Goethe's Faust will remember Auerbach's cellar as one of the strange scenes of that wonderful book, where Mephistopheles takes Faust to join a company of rollicking fellows. It is a noted place of resort for public entertainment, and is really one of the historical spots of Germany. We were, no doubt, in the very vault where both Dr. Faust and Goethe had caroused. There are two very old paintings on the walls, shaped like the segment of a circle, probably painted to commemorate the presence and achievement of Faust, one representing him as drinking to the sound of music with a crowd of merry-making students, and another in which he passes out of the door on a cask, a feat which, I believe, is historical.

Every traveller visits Auerbach's cellar. When we left, at midnight, it was raining, and as there was not a hack to be had, on account of the lateness of the hour, we were obliged to walk a somewhat indefinite distance to our hotel, and it was a source of infinite amusement to me to see my staid companion throw over his hat a large bandanna handkerchief which hung down around his face, asking every-body we met, in the blandest possible manner, the way to the hotel. We arrived safely at last and I found in the morning that we were directly opposite the great battle-field of Leipsic. The landlord very politely volunteered to go and point out the positions of the two great armies, the spot where Napoleon stood, and other interesting locations connected with historical events.

The celebrated field of Lützen, where the great Gustavus Adolphus fell, covered with honorable wounds, during the thirty years' war, is not far off.

Leipsic is the centre of the immense book trade of Germany. One of the largest wool markets of Saxony is also held there. It is, moreover, the seat of a great university, connected with which is a professorship of agriculture, held, at one time, I believe, by Thaer. At any rate there is a fine statue of that great teacher standing in front of the university museum. Dogs are made to work here, and we see them harnessed into all sorts of vehicles, drawing milk and other market produce. Women are met, with baskets full of live geese swung over the shoulders, and donkies are so common that they can be had in any number for ten or twelve thalers apiece.

The ordinary price of farm labor in this section is a half Prussian thaler, or about thirty-seven cents a day, the workman finding himself. This is about as much as I found it in any part of Europe. In most sections it is even less than that. In the county of Kerry, and in fact in most parts of Ireland, the ordinary price of farm labor is one shilling a day, the laborer finding himself. That is twenty-four cents of our money. But the misfortune is that it is difficult to find work, even at that, more than about half the time, so that the condition of the daily laborer is any thing but easy. Nor have they the advantage of any ten-hour system. It is from daylight till dark, and down right hard work at that. In other parts of that country the price is generally about the same. In Ghent, Belgium, the average price is about a franc and a half, or about thirty cents a day; the workmen finding themselves. In the neighborhood of Bonn, on the Rhine, it is ten silver groschen, or about twenty-five cents a day. In Wiesbaden it is from forty-two to forty-eight kreutzers a day for workmen on farms and on the road, or from thirty to thirty-five cents. At the farm of the Agricultural Institute, at Geisberg, near Wiesbaden, the price paid is thirty-six kreutzers a day, or twenty-four cents, the men in all cases boarding themselves. In and about Heidelberg, in the Grand Duchy of Baden, it varies from forty-two to forty-eight kreutzers. In and around Cassel, the daily wages amount to fifteen silver groschen, or thirty-seven cents.

On the way up the Rhine, several stout, fine-looking soldiers belonging to the Prussian army came on board. If I recollect aright, they told me they were stationed at Ehrenbreitstein. They were athletic, noble and able-bodied men as I ever saw. I asked them, in the course of conversation, what their pay was. The answer was, twelve silver groschen every ten days, that is just about *three cents a day.* In that case they were furnished with rations of course, but think of a man in the prime of life, when, if ever, he should be earning something and establishing himself, compelled, often against his will, to enter the army on three cents a day!

At the agricultural college at Weihenstephan the pay for female laborers in the field is twenty-four kreutzers, or about eighteen cents a day, finding themselves. This is in harvest time, when the price is higher than at other seasons. These prices everywhere seemed small for hard, earnest labor, and I could not help thinking how glad our own farmers would be to give double and board their workmen at that.

Now, it is true, that the price of living is not generally quite so high in the countries I have named as with us, yet the difference is nowhere so great comparatively as in the prices paid for labor. In fact, to live as well as our people of the same class do, the cost would be very nearly the same. The price of potatoes, for instance, in the neighborhood of Dublin, is seven pence a stone of fourteen pounds. That is a cent a pound, or sixty cents a bushel. Parsnips are four pounds, or about twenty dollars a ton. The price of good butter throughout Ireland is on an average a shilling a pound, so that a man has to work hard twelve or fourteen hours to earn a pound of butter. This is the price in town and country. The model farm at Glasnevin got eighteen pence, or thirty-six cents a pound in January of this year, 1863, and the lowest price at any time is a shilling or thirteen pence, that is twenty-four and twenty-six cents.

I made similar inquiries as to the prices of common articles as a means of comparison everywhere I went, and I know about how the case stands, for I made it a practice to record such items on the spot. The price of flour is about as high on the continent as with us, and I think the same quality of meats about as high.

This discrepancy between the prices of labor and the cost of living gave me a good text to talk to everywhere I went. When I told a hard-working, skilful gardener, who was toiling away at thirty cents a day, that the same kind of labor would command now from one to two dollars a day and all found, and that thousands of men would be glad to hire them at those prices they could scarcely believe me. This was a kind of missionary work I felt everywhere bound to perform, and I very rarely found a man who was not only willing, but anxious, to try his fortune and his hand in America.

From Leipsic to Jena is about two hours, partly by rail and partly by diligence. The route is altogether more picturesque than any portion of that from Hamburg to Leipsic, the country being finely undulating and highly cultivated. The roads are everywhere good and kept in the most perfect order on the macadam principle, and lined on either side with cherry or other fruit or ornamental trees.

Jena lies in the beautiful valley of the Saal. There are two lofty ridges, bare and precipitous, one on either side of the river. They terminate abruptly, but the beautiful meadow land along the river, and the rich pastures and cultivated slopes, together with the historical associations connected with these heights, to say nothing of the fame of the university here, lend the place a sort of charm, which would seem to make it delightful as a summer residence.

I had been fortunate enough on leaving Hamburg to fall in with a fine young man who was a student in the agricultural department of the university of Jena. We occupied the same coupé till my course for Leipsic and his to Berlin separated us. He was to spend a day or two at the latter place and I at the former. As good fortune would have it, without any preconcerted plan, we met again at a junction a little out of Leipsic, both bound for Jena. I found him intelligent and in the highest degree civil and agreeable, disposed to communicate all the information he possessed in regard to matters along the road, volunteering, also, to introduce me to Professor Stöckhardt and to show me the lions of the town. He pointed out the world-renowned battle-ground just before reaching the town, and the positions of the various forces engaged, and after we arrived, I was indebted to him for a great deal of information and kindness.

Jena had a peculiar charm for me from the fact that it was for several years the residence of Schiller and Goethe, and many other distinguished literary men of Germany, but especially from the fact that I had but recently finished the reading of the collected letters of Schiller and Lotte von Lengefeld, to whom he was married at the close of the correspondence. Very many of them were dated at Jena, and filled with the incidents and experiences of his life there. It is needless to say that these letters are full of love and tenderness. That is the characteristic of most love-letters, I believe, but this correspondence had led me to a more intimate knowledge of the peculiar characteristics of the mind of this great writer, than I had got from the previous reading of most of his works in their beautiful original language.

It was with a strange interest, therefore, that I visited the house, on the outside of which there is a tablet, "Here dwelt Schiller from 1789 to 1799." A curious custom prevails here of indicating in this way where the distinguished men resided during their stay in Jena. I should think there were several hundred such tablets on the fronts of the houses there. So strong was my desire to see and learn what I could of the life of this great man, that I visited Weimar almost on purpose to see the spots connected with the memory of the greatest of Germany's literary men—Schiller, Goethe, Wieland and Herder—whom the Grand Duke delighted to gather at his capital, and who earned for that small town the appellation of the Athens of Germany.

Schiller's house in Weimar is situated on a broad, quiet street, but a short distance from that of Goethe and Wieland. He occupied a suite of rooms on the second story, and they are left to this day just as he left them at his death. His desk and chair, his paintings, his bed, on which rests a cast of his features, taken after death, and a thousand little souvenirs, locks of hair, presents to Lotte, and mementos of various kinds, are shown for a consideration. The study which he occupied is adorned by pictures representing scenes in his various works.

Goethe's house was larger and more pretending. The study which he used is now occupied as a sort of museum of objects owned or collected by that great writer. I spent an hour there, but was not so fortunate as to gain admittance to the houses of Wieland and Herder. I shall never forget how my meditations were interrupted, as I stood on the opposite side of the street, gazing at the house of the former, when the housekeeper, in true German fashion, opened the front door and poured a bucket of vile slops directly into the undrained street. There was something so practical, or rather so unpoetical, in the idea that I immediately left.

Neither of these four great lights of German literature were natives of the Grand Duchy of Weimar. Wieland was a Swabian and was called to the capital of the little Duchy to assume the direction of the education of the young duke. He was the author of Oberon and Agathon, the translator of Cicero's letters, a man of genial wit, an original thinker, with a rich, elegant and playful fancy, which secured to him the love of those with whom he mingled. To the end of a long life he continued to be the pride of the old, who could appreciate his genius, and the delight of the young, who loved to call him "Father Wieland."

Goethe and Herder were invited by the government of the little Grand Duchy to be the companions of Wieland and the ducal family; the former having established a literary reputation in his native city of Frankfort, the latter a voluminous and popular writer, rapidly rising into fame. Schiller was first invited to a professorship at Jena, the university being under the patronage of the Grand Duke of Weimar, but owing to the condition of his health he was induced to reside at the little capital on a pension, I believe. These four great writers did more than any who had preceded them, or indeed of their own day, to establish the high character and reputation of German literature.

Schiller has been called the Shakespeare of Germany and no German poet deserves to be better known. One of his youthful productions, The Robbers, gave him a high position, but it is by Don Carlos, Maria Stuart, The Bride of Messina, and Wallenstein, that he should be judged, and either of these would have established the reputation of any man of his time. Nor is he less happy in lyric poetry. Many of his shorter poems are full of pathos, truth and beauty, and are to this day regarded as the gems of the language.

Goethe lived to sing the dirge over all his compeers, Herder, Wieland and Schiller. His was a brilliant and sparkling genius, as remarkable for its universality as for its richness and force. More than half of his long life was passed in Weimar, and for many years before his death he was the object of the unbounded admiration of his countrymen. He excelled in every style of poetry; but it was not in poetry alone. As a naturalist and a critic in the arts, as a biographer, as a novelist and historian he acquired a high rank. He was indefatigable as a worker in whatever he undertook. He was as many-sided as the phases of the human mind.

Near Wieland's house there stands the grand and life-like bronze statue of both Schiller and Goethe, on the same granite pedestal. It is a fitting monument to these two great men. They walked together in life; they gained an envied immortality, and now they stand side by side in that quiet street, in the little town of Weimar, which they did so much to elevate by connecting their names so long with its history.

But I must not forget the object of my visit to Jena, which was to see and examine into the working of the agricultural department of the university, and here I may as well introduce what I have to say of

## THE AGRICULTURAL SCHOOLS IN EUROPE.

These schools are of two kinds. Those which are connected, either directly or indirectly, with universities, and those which are independent of other institutions. With the former there is, in most cases, an experimental farm for the purpose of illustration and instruction, though the students are not expected to work on it; but in some cases it consists of a simple professorship, as at Edinburgh. With the latter, the higher institutes do not invariably expect the students to labor, though this is sometimes the case; but the location is, nearly always, if not invariably, upon a large estate, where the students can work or not, as they choose, the farm being carried on by hired labor or by students of an intermediate or lower school of practical agriculture connected with it.

I visited many of both descriptions, introduced myself to the professors, mingled with the students, attended lectures, joined in excursions, and in every way attempted to make myself familiar with their practical working and efficiency.

### INSTITUTE AT JENA.

As soon as I arrived at Jena I visited the laboratory and collections, was introduced to the director, Dr. Stöckhardt, and was politely entertained by his agreeable family. He very kindly placed much information in regard to the school at my disposal.

The Agricultural Institute at Jena is designed to educate young farmers, political economists and financiers.

For such young men, especially, as have already spent some time in the practical operations of farming on large or medium-sized estates, it offers an opportunity to educate themselves scientifically in their department. But for such as will prepare themselves for political economists and financiers, it offers that special instruction in agriculture which is essential to them.

CONNECTION OF THE INSTITUTE WITH THE UNIVERSITY.—The institute is an integral part of the university at Jena, and is under the same government. The director and most of the professors are also connected with the university; those who enter the institute for farmers are matriculated as students at the university, and attain thereby all the rights, and assume also all the responsibilities of academical students, the same as in any other department of the university.

The advantages which the institute gains through the union with the university, pertain in part to the means of instruction, and in part to the spirit of the academical life.

To the means of instruction of the university which the members of the institute can enjoy, belong, besides the lectures on those parts of natural science and political economy which are not to be had in an isolated institute, and the lectures upon mathematics, philosophy, history, general law, &c., the library, the botanical garden, the mineralogical museum, the zoölogical cabinet, the observatory, the gymnasium, the riding, swimming and boxing schools, &c.

In consequence of the use of these means of instruction, the institute stands in an independent relation with the university, which secures it great advantages; yet far more important is the more intimate connection with it, that is, the necessity that its instruction of the same principles should be more general and comprehensive, and fundamentally scientific, like that of the university, that the institute, through an intimate sympathy in the emulation of the university students, and in connection with them should realize the idea of German university life, and thereby advance the higher education of students in agriculture and political economy.

OBJECTS OF INSTRUCTION.—The sciences useful to the farmer which the institute teaches, are as follows:—

I. Sciences relating to the branches of agriculture. Sciences bearing on the cultivation of agricultural plants, in its whole range, as climate, soils, cultivation, tillage, manuring, seed, after-culture, harvesting, culture of grains, mercantile and fodder plants, fruits, &c. The breeding of animals, in its whole range, the principles of breeding, nourishment and care, raising, keeping and use of particular sorts and races of domestic animals; farm management, with all its branches, book-keeping, valuation, &c.; agricultural excursions, demonstrations and conversations.

II. Fundamental and auxiliary sciences of agriculture.

National economy, agricultural history and statistics, agricultural law, physics, meteorology, general chemistry, agricultural chemistry, practice in the laboratory, qualitative analysis, quantitative demonstration of agricultural materials, grains, oil fruits, guano, other kinds of manures, soils, plant ashes. Mineralogy and geognosy, including knowledge and classification of soils. Botany, with special reference to the physiology of plants; including botanical excursions, instruction in forestry, care and use of woodlands. Gardening. Zoölogy, with special reference to knowledge of insects. Veterinary science, anatomy and physiology of domestic animals on the farm; pathology and therapeutics, chirurgery, shoeing, &c. Mechanics and machinery, agricultural machinery and implements, their construction and use. Agricultural technology, distilling, brewing, sugar making, bread making, manufacture of vinegar, including technological excursions. Geodosy, use of the surveyor's chain and theodolite, field measuring, levelling, agricultural mechanics.

The arrangement of these various branches is such, that those bearing on agriculture, national economy and the natural sciences generally, are repeated annually, some of them twice a year, and others only every two or three years.

For the ancient and modern languages, the fine arts and all gymnastic exercises, the university offers extraordinary opportunities to those who desire it.

Besides the above-named lectures, excursions and conversations, the institute offers all essential means of instruction, such as the public domains at Zwätzen and Lehesten, embracing about 1,400 acres; with a numerous herd of cattle, a distillery, brewery and silk-raising establishment, which serve as means of illustration;

An agricultural botanic garden, attached to the botanic garden of the university;

A well-appointed chemical laboratory with a sufficient number of convenient working desks;

Collections of minerals and earths, dried plants and seeds, models of fruits, collections of insects, technical apparatus, so far as requisite for reference in the lectures;

A valuable agricultural library for the use of the students;

A reading room where all the agricultural papers are taken;

An infirmary for sick animals, with a room for operations and necessary tools;

A rich collection of pathological preparations and objects.

Special lots are set apart for experiments. Besides this there is a government experimental station at Jena. The object of this is to develop the natural laws which relate to agriculture, through scientific investigations and experiments conducted in the most scientific manner. It is requisite that young men should learn how to institute and conduct scientific investigations.

KIND OF INSTRUCTION.—The university is distinguished from other institutes of instruction, less through what it teaches than the mode adopted. The agricultural institute is a constituent part of the university and must be an active member of its organism, and therefore it must maintain a mode of teaching consistent with the claims of a university, that the instruction imparted may incite to self-activity; that the student may attain, by the wise use of academical freedom, the objects of his college course, as far as possible, through self-culture; that he may, as far as possible, be thoroughly educated, not in one or two branches, but in all. So far as regards instruction in agriculture, the professors strive to make it enthusiastic, intelligible and practical.

COURSE OF INSTRUCTION.—The course of instruction in the principal sciences can be completed in four half-yearly terms, but the student is advised to pay more attention to auxiliary branches, which require a three years course. But the subjects are so arranged that new members can enter twice a year, in spring and in autumn. Every one on entering is expected to make known his objects and intentions, and the time he can devote to theoretical studies.

The beginning and ending of the institute lectures are governed by the terms and vacations of the university, and public announcements are made through the public journals. They generally begin at the end of April and the end of October. The members of the institute devote their vacations to agricultural excursions or to a visit to some landed estate. The students can room in the buildings of the university, or in private houses in the city.

The cost of tuition for agricultural students is, for the first term, 64 Prussian thalers, or $40.50, for the second, $36, for the third, $18, for the fourth, $4.50. There is a matriculation fee at the university of about $5, a half-yearly lecture fee of 75 cents, a payment to the treasury of a hospital society, a sort of insurance against sickness, of 25 cents, and a few other small regular sums to be paid, including the diploma on graduation, of $1.62½. Then, if the agricultural students attend any of the strictly university courses of lectures, they have to pay the same fees as other students. For lodging, including study and sleeping room, furnished with sofa, chairs, table, bed and other necessary articles, and attendance, from $7.50 to $15 a term. For heating and lighting, in winter, $7.50 to $12; also $1.50 for "boots," and $3 to $5 a term for washing.

The candidate for admission must bring a certificate from the magistrate of the place where he has last resided; a consent of father or guardian to enter the institute; a certificate of his teachers, and an explicit description of his past life. He must have sufficient knowledge of elementary studies and the German language to understand scientific lectures, but no formal examination is required on admission.

An attendance at a high school, or a polytechnic school, at least up to the higher classes, or at some practical school, and one, two or three years passed in practical work on a farm, is recommended as a preparation for admission to this institute.

The following is the arrangement of lectures at this institute:—

*Hours of the Lectures in the Agricultural Institute of the University of Jena, Summer Term,* 1863.

<table>
<tr><th>HOURS.</th><th>Monday.</th><th>Tuesday.</th><th>Wednesday.</th><th>Thursday.</th><th>Friday.</th><th>Saturday.</th></tr>
<tr><td>7 to 8, .</td><td>Botany.</td><td>Physiology of Plants.</td><td>Botany.</td><td>Physiology of Plants.</td><td>Botany.</td><td>Physiology of Plants.</td></tr>
<tr><td>8 to 9, .</td><td colspan="6">General Chemistry, Chemical Technology.</td></tr>
<tr><td rowspan="2">9 to 10, .</td><td colspan="5">National Economy.</td><td rowspan="2">Architecture.</td></tr>
<tr><td></td><td colspan="4">Science of Finance.</td></tr>
<tr><td rowspan="2">10 to 11, .</td><td colspan="6">Experimental Physics.</td></tr>
<tr><td>Introduction to the Sciences.</td><td>Veterinary Science.</td><td colspan="2">Politics and Government.</td><td>Veterinary Science.</td><td></td></tr>
<tr><td>11 to 12, .</td><td colspan="2">Encyclopædia of Agriculture.</td><td>Agricultural Mechanics.</td><td colspan="2">Sheep Breeding and Wool.</td><td>Field Measurement.</td></tr>
<tr><td>2 to 4, . .</td><td colspan="5">Work in the Chemical Laboratory.</td><td rowspan="3">Excursions.</td></tr>
<tr><td>4 to 5, . .</td><td></td><td>Horse Shoeing.</td><td>National Economy.</td><td></td><td>Farriery.</td></tr>
<tr><td>5 to 7, . .</td><td>Surveying.</td><td>Valuation.</td><td>Latest Agricultural Improvements.</td><td>Valuation.</td><td>Surveying.</td></tr>
</table>

Excursions and demonstrations, as well as veterinary illustrations, are appointed by the Director at stated times.

The investigations in the chemical laboratory take place daily from 8 to 12, A. M., and from 2 to 4, P. M., except on Saturdays. Beginners work only on Mondays, Tuesdays and Wednesdays in the afternoon.

Students in Mathematics attend lectures on elementary mathematics, Mondays, Tuesdays, Thursdays and Fridays from 6 to 7, A. M.

There are eleven professors and instructors of the institute. The number of students is at present one hundred and ten, ranging in ages from 18 to 21 years, I should think. The

### SCHOOL OF PRACTICAL FARMING

is at Zwätzen, but a short distance off. In that the sons of peasants are educated, and they have to work their way.

The general oversight of this practical school resides in the Ministry of the Interior of the Grand Duchy, the direction is committed to Prof. Stöckhardt, of Jena, and the immediate management to a superintendent on the place.

The object of the school is to give its pupils an education which will fit them for the skilful practical management of middling-sized and small estates.

The course of instruction extends over two years, and is devoted to the following objects: Religion, the German language, arithmetic and geometry, drawing, singing, geography and history; physics and natural history, agriculture, meadow management, fruit and garden culture, cattle-breeding, instruction in the carrying on of the farm in the most skilful manner, book-keeping, agricultural mechanics, and field measuring.

The division of these objects of instruction is so arranged that in addition to the school studies comes teaching in general preparatory sciences and the different branches of agriculture. Besides suitable means of instruction, is the opportunity of observation on the estate at Zwätzen, and the advantage of veterinary lectures and teaching in the Veterinary School at Jena.

The employment on the land belonging to the school, which has recently been increased, as well as in the workshop for the manufacture of agricultural implements, serves as a practical illustration of the instruction in the school, and as a means of preparation for the future calling.

The pupils live with the family of the superintendent and his assistants, and all eat at the same table. They are expected to have had some practice in farm labor on admittance. Natives pay 80 thalers or $60 a year, others $75, for instruction, lodging and board. The admission of new students takes place in the spring and fall.

Here is a notice translated from the printed circular, or programme: "Every pupil, as he enters, has to bring with him a bed, with three coverlids,—the school furnishes bedstead and mattress,—one Sunday and two week-day suits, a trunk to keep his clothes and linen in, 6 shirts, 2 pairs of stockings, 6 towels, 6 pocket-handkerchiefs, 2 blue aprons, 2 pairs of boots, a pair of slippers, a comb, a wash-bowl, 2 plates, a couple of knives and forks, a spoon, a couple of cups and saucers, clothes and shoe brushes,—all to be marked, if possible." It's a convenient thing to have one's wardrobe so minutely specified.

As I have alluded to the agricultural school at Jena, connected with the university, I will also say a word in regard to one or two others of the same class; that is, connected in a similar manner with other institutions.

### POPPELSDORF, NEAR BONN.

The agricultural college at Poppelsdorf, connected with the university at Bonn, I had taken in my trip up the Rhine. It is some ten miles above Cologne, beautifully situated on the left bank of the river, within sight of the far-famed Siebengebirge, or seven mountains, and the Drachenfels. Bonn is beautified by the most attractive terraces along the river, and a magnificent avenue leading to Poppelsdorf, nearly a mile, studded with superb chestnuts in double rows, on either side.

I called at once on Dr. Hartstein, the director of the agricultural school, who kindly gave me the information I sought in regard to its present position and prosperity. Close by his house is an ancient castle, now used as a depository of the extensive scientific collections belonging to the university, to which the students in agriculture have access. The model farm of the agricultural institute is also close at hand. This is used for the purposes of experiment, and the crops on the experimental plots were very striking. Extensive mulberry hedges surround the fields, and the silk-worm was in the full tide of successful operation.

The scientific lectures extend over not only the branches requisite in the department of agriculture, but also the fundamental and auxiliary sciences connected with it, viz.:—

(*a.*) Agriculture in its whole range as a leading science, and especially

1. The science of tillage, which is divided into a general and special branch. In the one are the knowledge of soils, manures and the working of the land, the seed, care of the crop, and harvesting of agricultural products in general is taught; in the other, more exact instruction is given, as to the judicious cultivation of each one of these products. In this connection the formation of permanent meadows, and especially artificial meadows, is considered.

2. The science of cattle breeding, or the production of animals, which also includes a general and a special course. In the first, instruction is given as to the different races, the pairing, breeding, feeding, care and fattening of cattle in general; in the second, the breeding of cattle, sheep, horses, swine, &c., in particular.

3. The proper farm management, taking in the whole agricultural profession, and including general rules and principles. The principal divisions are, the objects of agriculture, land, capital and labor, sale and leasing of estates, different systems of agriculture, the arrangement and direction of farms, and of taxation and book-keeping.

To these lectures upon agriculture are added those on fruit management, garden, fruit and vineyard culture.

(*b.*) Chief and auxiliary sciences.

1. The natural sciences, chemistry and physics, zoölogy, botany and mineralogy, with special reference to agriculture, and so far as they are of importance, to the farmer in the oversight and judicious direction of his estate.

2. Mathematical sciences, especially applied geometry, stereometry, statics, hydrostatics and machinery connected with the practice in field measuring, levelling, drawing of plans, &c.

3. Popular agricultural literature, so far as it serves as a safe ground-work for practical agricultural instruction.

4. Agricultural technology.

5. Veterinary science.

6. Agricultural mechanics.

7. Laws relating to agriculture and the cultivation of lands.

8. History, statistics and literature of agriculture.

The farm connected with the institute serves for practical illustration, as well as the excursions which, from time to time, are taken in the neighborhood, and during vacations, also, into more distant regions. The institute is in want of no auxiliary means of making the theoretical and practical instruction most useful. Among these are the chemical laboratory, erected especially for agricultural investigation, the physical apparatus and the instruments for land measuring and levelling, the collection of minerals and ores, the zoölogical and veterinary collection, the collection of models and implements, and of wool, the library, the economic botanic garden, the botanical collection and the estate, with the experimental fields and the vineyard. Besides these peculiar means of instruction of the institute, the use of the rich collections and apparatus of the university, the royal university library, botanic garden and natural history museum, is available.

Students pay an entrance fee of six thalers, and a fee for tuition of forty thalers, or thirty dollars, for the first term. The amount for the second term is thirty thalers, the third twenty and the fourth ten, making the fee for the whole course of two years, one hundred thalers, or seventy-five dollars.

The lectures embrace a two years' course, the terms being arranged to conform with those of the university. The special plan of instruction is made known each term. The school is designed for those who desire to educate themselves for skilful farmers, and those who devote themselves to the studies of the university, and at the same time wish to become familiar with the operations of agriculture. Students who are entered at the university of Bonn, and enrolled in any of the faculties, can attend the agricultural lectures on application to the director.

Applicants have to bring certificates of good conduct. No proof of specific attainments in elementary school studies is required, but it is desired that, before visiting the institute, the pupil should be familiar with the practical manipulations of farming, and be able to show proof of it.

On admission, the student is matriculated and enrolled in the faculty of philosophy at the university. By this he acquires all the rights and undertakes all the obligations of the university students.

The whole establishment is under the control of the royal ministry for agricultural affairs at Berlin.

The experimental farm, close by the school, contains, I believe, about seventy acres. I visited the barns and out-buildings, all of which appeared to be in admirable condition, a place for everything and everything in its place.

But seven or eight cows are kept, and those are all Dutch, which are thought there to be among the best for milk. No experiments appear to be made there to test the comparative merits of different breeds. A long series of experiments in the fields near the house seemed to be conducted in the most careful manner. Many of the plots of wheat were of extraordinary growth. A great variety of plants are cultivated, chiefly for the purpose of instruction.

I visited Gissen, Göttingen and Halle, with each of which universities there is an agricultural department connected, but they do not differ materially, so far as I could learn, from those at Jena and Bonn.

## GEISBERG.

The agricultural institute at Geisberg near Wiesbaden is the principal if not the only one of the kind in the Duchy of Nassau. I visited it in July. It stands on an elevated plateau overlooking a most enchanting region of country, with the fashionable invalid resort of Wiesbaden close by, while at a little distance rolls the winding Rhine between its vine-clad hills. The celebrated vineyard of Johannisberg is not far down the river. This school differs from most others in giving instruction only in winter.

It is on the isolated and independent plan, and is designed for the instruction of practical farmers, without teaching practice on the place. Applicants must be sixteen years old, possess a good elementary education, and a good "character." They have to bring a written certificate of willingness on the part of the parent or guardian that they should enter the school, and it is expected that pupils shall have spent one or more summers in work on the farm before they enter. If the requisite certificate of proficiency in the elementary studies cannot be produced, or if it is not satisfactory, the applicant is examined, and either rejected or accepted with conditions, not unlike the practice in entering Harvard College, where comparatively few get in without "conditions."

Each pupil is required to attend all the lectures ; but they have a class of pupils as they have at Hohenheim, called *hospitanten*, or students who take only the partial course.

The theoretical instruction is given in a regular course of two winters, the term beginning on the fifteenth of October of each year, and ending on the thirty-first of March. During the intervening summer they are either at home, at work on the farm, or, if they desire it, the director of the institute procures them suitable places with skilful practical farmers.

Natives of Nassau pay no tuition. Outsiders pay forty-four florins, or about eighteen dollars, a year. All the pupils board in the town of Wiesbaden. The instruction is by lectures and written and verbal questions on the studies. After the return of the students from their summer's work on the farm, they are required within six weeks to present a full written detail of operations, which, after suitable corrections, are returned to the writer.

The parents or guardians are informed, from time to time, of the industry and conduct of the pupil. Gambling, so fashionable and exciting at Wiesbaden, is forbidden, and no student is allowed to smoke or to keep a dog.

The institute possesses a library, which appeared to be tolerably well stocked, very good collections and fine lecture and study rooms. It is on rather a small scale as compared with some others, though it may be called one of the superior class. It was founded in 1835, and, as may be inferred from what has been said above, on the principle that it is of no use to try to teach the theory and practice at the same school. There is a small farm connected with the school, but, judging from the helter-skelter, or generally mixed-up condition of everything about the premises, I should think they were quite right in not attempting to teach practice there. Old ploughs, drags, carts, harrows and every thing else lay around the buildings in no small confusion. When I drove into the yard I felt sure we had made some mistake, and had got upon the premises of a very slovenly farmer, but the driver was sure he was right, and the result justified his topographical knowledge. The farm buildings are irregular and crowded, not large or imposing, but rather ordinary in every respect, though the building used by the students and the collections was better.

These collections consisted of minerals, birds, quadrupeds, seeds, grains and grasses, and a fine collection of wax fruits.

The instruction embraces, in the first term or winter, the German language, arithmetic, botany, mineralogy, physics, general agriculture, cultivation of meadows, rural architecture and veterinary science. In the second winter the boys take up zoölogy, physics, farm accounts, special agriculture, special zoötechny, horticulture, technology, veterinary medicine and composition.

The director had left for the International Exhibition at Hamburg, so that I was obliged to find my way about without much assistance. The price of farm labor there, I learned, was thirty-six kreutzers, or twenty-four cents, a day, the men boarding themselves.

### HOHENHEIM.

Many a grand enterprise, like many an illustrious man, grows up from small beginnings. Schwertz, who may be called the founder of the agricultural school at Hohenheim, began its direction towards the close of the year 1818, with only eight pupils, six of whom were natives of Würtemberg, and two from abroad. It is now generally admitted, and I think with justice, to stand at the head of the institutions for agricultural education in Europe. I propose, therefore, to enter, to some extent, into the details of this establishment, and to dwell upon them at length, even at the risk of being tedious.

I arrived at this celebrated agricultural institute on the 29th of July, and took a room, such as is occupied by the students, in the building, prepared to stay some days, or till I could "get the hang of it." It was a strange feeling that came over me at first, in the midst of a crowd of rollicking German students, rooming among them, eating with them, and mingling with them in their walks, in the lecture room, and in the long corridors of this quaint old ducal palace, a monument of the wealth, the luxury and the morals of a century ago, on which hangs a tale, which I have not time to unfold.

Hohenheim is some seven or eight miles from Stuttgart, the capital of the kingdom of Würtemberg, the road lying through vineyards and orchards and royal forests. Long before my arrival at head-quarters it was easy to see that I was riding through the fields of the institute. The fruit trees were labelled and numbered, the fields and the rotation upon them, were indicated by stakes and cards, and everything gave evidence of thrift and skill and scientific management. What capital roads! Nothing but a royal decree could have lined them everywhere with cherry and apple and pear trees, stretching away as far as the eye could reach. No fences mar the open landscape, either along the highway or on the division lines. There is a little footpath that leads through the woods, a beautiful, shaded walk to Kleinhohenheim.

But here we are at the very door, at this fountain-head of agricultural science. I introduced myself at once to Professor Rau, whom I already knew well by reputation, and found him quite free to communicate all the information in his power; to accompany me to the various parts of the establishment and the farm, and to give me access to the lectures which should take place during my stay. He placed in my hands a beautiful royal octavo, which had just appeared, a *Beschreibung der land-und forstwirthschaftlichen Akademie Hohenheim*, containing many illustrations and historical sketches of the estate, the course of instruction and management of each department, the experiments and the stock, and to this, and the other documents which he gave me, I am indebted for much of the information I am about to present, in regard to this school of agriculture.

Hohenheim really consisted, for some years, of three quite distinct schools, which, though erected on the same estate, and, as it were, under the same roof, were, and still are, as independent of each other, in most respects, as if at opposite ends of the kingdom.

1st. The institute or school of agriculture, for young gentlemen.

2d. The school of forestry.

3d. The school of practical farming, for the sons of peasants.

The lands, plantations, gardens and nurseries connected with the old chateau are wholly devoted to the purposes of the three establishments, and serve professors as well as pupils for illustration and experiment; while the extensive royal forests in the neighborhood and lengthy excursions made every year, give a wide range of observation, especially for students in the management of forests.

The agricultural institute originated, in a measure, from the establishment of the agricultural society of Würtemberg, in 1817, when the necessity of a model farm and an institute of instruction and experiment became strikingly apparent, as a means of the development and the elevation of agriculture in the estimation of the people.

The success and popularity of the school, founded in 1806 by the illustrious Thaer, at Möglin, in Prussia, had no doubt contributed largely to this feeling among the agriculturists of Würtemberg. Thaer's enterprise was undertaken at first on his own private account, and so continued till the year 1819, thirteen years after its commencement. It so happened that the introduction and spread of fine-woolled or Merino sheep into Northern Europe, and especially upon the farm at Möglin, near Berlin, concurred to attract to this private effort a large share of public attention, while the reputation of Thaer rapidly grew at home and abroad, not only as a consequence of the success of his school, but likewise from his valuable publications. His school was therefore taken under the patronage of the government, as a royal academy, but the management of the estate still remained at the risk and expense of the owners, the instruction only being paid by the government. This led to a mixed arrangement, the evils of which very soon began to develop themselves, and in time to be avoided at Hohenheim, where the whole establishment was taken under the control of the government, and located upon a royal domain.

A part of this domain happening, at that time, to be under lease, it was necessary to begin the instruction on the small adjoining estate of Carlshof, consisting of only 255 acres. A small beginning was therefore a matter of necessity, and this was to continue till the year 1822, when the broad estates of Hohenheim would be at the service of the institute, at the head of which stood Schwertz, who was placed, by the confidence of the king, in full control of the property, with only the assistance of a farm inspector and two of his pupils. He personally arranged everything, and even managed the finances of the school, which, for the first two years, remained on this simple foundation, as a purely agricultural institute. But in the year

1820, the school for the management of forests, which had previously existed at Stuttgart, was removed to Carlshof and placed under the direction of Schwertz, though still independent for all the purposes of instruction. The greater number of students were then, as they are at present, students of agriculture. Last year ('61–62) for instance, there were 124 agricultural students and but 37 foresters.

The limited number of foresters may be owing in part to the rigorous conditions of admission to the forest school, the applicants for which must have practiced in the management of woods for at least two years under a head steward of forests. It was thought that a general connection of instruction in forestry with that in agriculture would have some important advantages, as, for instance, for the pupils of the agricultural institute, who are either owners or to become, in future, stewards of large estates, in which the management of forests would often be of great importance, while the contact of a class of students who have to submit to a rigid examination on which their future success will largely depend, would be very useful as an example of good conduct and studious habits, to students in the agricultural institute who are not obliged to work. It would be a desirable stimulant to exertion. Then the union would enable the two to give a wider range to the instruction in both, the students of each having an opportunity to avail themselves of lectures which they could not otherwise have, so that the foresters, for instance, could get a general knowledge of agriculture which they would not gain in a special school. Experience has accordingly justified this change, and the arrangement still exists.

Originally the whole instruction in agriculture was given by Schwertz, who taught general and special plant culture, cattle breeding, vine culture, book-keeping, &c. Two professors were soon appointed, one of mathematics and the other of the auxiliary natural sciences, while instruction in veterinary science was given by the medical councillor-in-chief of the government, who went over from Stuttgart once a week for the purpose. The removal of the forest school added one only to the corps of instruction, but on the acquisition, in 1822, of the domain at Hohenheim, the farming operations became still more extended, and men scientifically educated were required in each chief branch of farming, and an instructor in sheep breeding, another in agricultural technology, and another in the culture and management of fruit-trees, were appointed, from time to time, as the exigencies required.

Pupils in the higher or agricultural institute paid, if natives of Würtemberg, $164 for tuition, lodging and board, or if from abroad, $205 ; and all ate at a general table. But in 1825 it was thought more convenient to separate the cost of board from the other charges, and the price of tuition and room was fixed at $41 for natives and $123 for strangers. All were required to room in the building till 1842, since which time the pupils have had the liberty to board out of the institute if they choose.

It will be seen that the agricultural institute is founded upon a large and liberal basis, and everything that strikes the eye would lead one to think that it is the chief and most important object; yet, important as it is, it is probable that the practical results of the School of Practical Farming, the *Ackerbauschule*, are quite as valuable as those of the institute, which makes greater pretensions and enjoys greater facilities for instruction in the higher sciences.

This school of Practical Farming was begun at the close of 1818, with ten stout boys of 14 years of age from the orphans in Stuttgart and other cities. These boys had but one instructor, who had to keep them at work and train them to the greatest possible activity, order, and good conduct. They received to some extent the theoretical instruction of the students in the higher institute, but in 1824 they began to have more or less theoretical instruction adapted to the capacity of each, and to their future designs.

This practical school was modified in 1829, when the number was extended to 25, and instead of taking orphans as heretofore, the sons of peasants especially, were to be admitted, between the ages of 16 and 18, who, as they were already familiar with the ordinary routine of farm work, could be immediately useful on the farm and taught the improved processes of agriculture in a shorter time.

They are required to spend three years at Hohenheim, and must be natives of Würtemberg. Their instruction in the theory of agriculture is limited to two hours a day.

The arrangement with regard to orphans was kept up, the number being limited to twenty-five, who were required to spend two years at Hohenheim, in order to get sufficient agricultural knowledge to be capable of becoming teachers in schools for the advancement of agriculture in their own districts, but this arrangement was given up in 1828 on account of the cost.

Special Courses.—A school of gardening was established in 1844 at the same place, but still independent of the others. Six pupils only were admitted into this, and each must have attained the age of seventeen years. Each applicant must have spent three years as gardener or vintager, or attended the course at a farm school, and the garden school aimed in one course to perfect what had previously been begun in the art of gardening and fruit culture. Then, in addition, there were established at the same place, special courses for orchardists, meadow husbandry, shepherds and school teachers.

The course for orchardists, which has been continued since 1850, was designed for young men of 18 years and upward who wished to prepare themselves for managers of the fruit trees belonging to the communes or parishes, of which there are immense numbers everywhere around the villages and highways of the kingdom. This course lasts from four to five weeks in the spring of each year, and a few days later in summer for practice in grafting. On account of the crowd of applicants to this course, in the last few years, from all parts of the kingdom, it became necessary to extend it to three courses a year, with from fifteen to twenty pupils in each, so that now this theoretic and practical instruction in fruit culture continues from the middle of March to the end of May, and a continuation of the course occurs also in August.

The five weeks' course upon the technical management of meadows, has been continued regularly in the spring since 1855, whenever there has been a sufficient number of applicants. It includes the art of treating meadows, field drainage, the establishment of boundaries or practice in applied geometry, for those who wish to perfect themselves in farm engineering. The number of attendants on this course has averaged 8.

The course of instruction for shepherds was opened for the first time in 1855, and has continued uninterruptedly since with an average of 10 to 12 attendants. Applicants are required to be over 20 years old and to have been in practice with shepherds four years. The course takes place in February and lasts four weeks.

To these courses was added another in 1860, for school teachers, which is limited to three weeks in the autumn vacations of the public schools. The principal object is to provide the means of a continuation of their agricultural education, which was found to be needed in many parts of the country. Such teachers only are invited to attend this course as have busied themselves on their own or on the school grounds, with agricultural labors, in the formation of means for improvement in agricultural education. The instruction embraces the whole of agricultural labor, with special researches into the imperfections and failings which appear in different parts of the country. The number who may attend each course is fixed at 25.

Instruction in these several courses is given partly by the regular corps of professors of the institute, and partly by persons from abroad who make a specialty of certain pursuits, who go to Hohenheim for the purpose, and the arrangement is such that the pupils during their stay in Hohenheim are occupied the whole of each day, partly in hearing lectures, and partly in demonstrations in the field, in the stalls, in the collections, or in excursions, and partly in the solution of prescribed tasks.

These may be called regularly established courses of special instruction. But in addition, what may be called extraordinary or occasional courses, are also given, as, for instance, in 1853, a course upon silk culture, another on bee culture and on the nursery business. They took place in the afternoon of each Wednesday, from four to six, and were attended by twenty young men, mostly sub-teachers or assistants in the schools. In 1855, another course was given upon silk culture, designed for the pupils of the normal schools, of whom one hundred and thirty-four attended. A similar course of agricultural instruction was given in 1861 for the school teachers in the jurisdiction of Stuttgart, in which fifty-two teachers of the public schools engaged. The lectures were accompanied by demonstrations in the field, and in the collections, an afternoon of each week, and the design was to prepare the teachers for holding evening agricultural schools in winter. And so in 1852–3, on the occasion of considerable changes in the laws regarding distilled liquors, two courses of instruction were given to the revenue officers upon the processes of distilling. One lasted ten days and the other twelve, and was attended by over sixty officers of the revenue who desired the information. And so, also, a vast amount of labor is done and information imparted in answer to letters and through numerous publications by the professors, all of which widen the circle of influence of the institution.

The means of instruction in the institute proper were limited, as already stated, at the foundation, to a physical and mathematical apparatus, an outfit for the chemical laboratory and a little natural history collection, for which the queen had contributed a thousand florins, and this was confined strictly to agriculture. Still with the small number of pupils it was made the means of important instruction in special branches. As for the farm a greatly improved arrangement of lands was adopted than that common in the neighborhood, either then or at present. Schwertz, who was born at Coblentz in 1759, and who was familiar with the agriculture of Belgium, where it was carried on in the highest perfection then known, not only got many improved implements but also a skilful foreman who was acquainted with their use and could teach it to others.

An implement manufactory formed a part of the design, one that should not only supply the wants of the farm with the best tools, but be the means of introducing the most improved implements into the country, and the institute was extremely fortunate in getting the right man for the place, one who had been with Fellenberg at Hofwyl, as an implement maker, and who not only answered expectations, but soon won a high reputation for the implement branch of the establishment by the strength and goodness of the work.

In 1852, and each year since, arrangements were made for the purpose of securing a more rapid and general spread of improved agricultural implements throughout the country whereby master wheelwrights and smiths were provided with an opportunity by a stay of some six or ten days in the implement manufactory at Hohenheim, of becoming familiar by observation, handling, drawings, models, &c., with the course of business and the manner of manufacture there, and the master mechanic took it upon himself to give the requisite explanations. Up to this time no less than seventy-seven master smiths and fifty-eight master wheelwrights have availed themselves of this opportunity to perfect themselves in their business.

But as imperfect and defective as were the arrangements at the outset, at Hohenheim, there was one thing that neither the director nor the pupils were in want of, and that was an earnest love for their work and an enthusiasm for the high reputation of the new institute. It was not the least of the merits of Schwertz that he knew how to infuse such an enthusiasm into all his pupils. Where such a spirit reigns great things are easily developed from small. Forty-five years have now passed away and from the weak seed then planted a strong fruit-bearing tree has developed its wide-extended branches. From eight pupils of 1818, the number has increased to one hundred and fifty in 1863; and from one great professor the number has grown to twelve.

Such is a brief sketch of the earlier history of the institute at Hohenheim. Let us look for a moment to its present position and prospects.

The domain consists of about 825 acres, not including a vast forest of over 5,000 acres, belonging to the government. The government exercises a controlling influence in the general management of the institute, and the reports and financial standing of the establishment are made to the proper authorities at Stuttgart. But at Hohenheim, the institute, as well as the farm with all its branches and dependencies, is under the immediate control of the director, who has an assistant, or secretary, also a farm assistant, who acts also as a tutor in the institute. There is also a treasurer and a book-keeper, a librarian, who assists in the office, an overseer in the institute, a house-master and a post-master. The director, at present von Walz, is also head teacher of agriculture, and lectures upon agricultural practice, taxation of property, special plant culture and agricultural architecture.

There are nine established professors, as follows:—

Dr. Riecke, professor of mathematics and physics.

Karl Siemens, professor of agricultural technology and head director of the implement manufactory.

Dr. Fleischer, professor of geognosy and botany, and director of the botanic garden.

Dr. Nördlinger, principal teacher of forestry, and steward of the hunting grounds at Hohenheim.

Dr. Emil Wolff, professor of chemistry, and director of the agricultural chemical laboratory.

Dr. Rau, professor of agriculture, who lectures upon agriculture in general, plant culture, meadow management, vine, hop and tobacco culture, breeding of cattle, sheep and smaller animals.

Dr. Rueff, professor of veterinary science, who lectures upon zoölogy, horse-breeding and silk culture.

Professor Fischbach, second teacher of forestry and steward of the forests at Denkendorf.

Besides these, there is a teacher of book-keeping, another of national economy and the laws of forests, a director of the garden school, who teaches fruit and root culture, and a head teacher, Mr. Kik, manager of the farm school, who gives instruction in bee culture. The farm inspector also conducts some agricultural exercises on the experimental field.

These professors are appointed by the king, upon presentation to the minister of the interior, made by the general council of agriculture.

The salary of the professors, like the pay of scientific and literary men generally in Germany, is very small, scarcely adequate to their support, even on a very economical establishment. This accounts for their prolific pens. They are compelled in very many, no doubt in the vast majority of cases, to write books, prepare articles for the scientific journals, and otherwise to eke out the means of a respectable support. The cost of living is, in some sections, a little less than with us, to be sure, but to live equally well, the difference is but small, so far as I could judge from the cost of very many articles which I could compare.

The salary of the director amounts to 2,500 florins, $1,025. That of three professors, each 1,500 florins, $615. One professor has but $533. Three others have $492 each. Another, $348. Two assistant teachers, each $102. As the professors and their families room in the buildings of the chateau, which are amply sufficient for the accommodation of all, and many more, I do not suppose they are charged with rent.

The students of the higher institute are admitted, after the age of eighteen, without examination, on certificate of willingness on the part of parents and of industry and good conduct at the schools hitherto attended, and at any time during the year, and are held to no very rigid discipline, being required to attend three of the regular courses every week, which they may select. They rise and go to bed when they choose, and employ their time as they choose, and go out from the institute with an examination. Many sons of wealthy families are no doubt attracted there by the beauty of the institution for an agreeable temporary residence. They have as complete control of their time and their actions, within the reasonable limits of good conduct of course, as the students at our law, medical and divinity schools. It may not be generally known that all students in German universities are left or thrown upon their own responsibility to a far greater extent than the students of any of our colleges. Their whole early education familiarizes them with this liberty, and it is not probably so liable to abuse as it would be with us. But it is no less true that real severe study requires the stimulus of emulation, and necessity or compulsion, especially upon minds not arrived at full maturity.

The lectures begin at six o'clock in the morning in summer and at seven o'clock in the winter, and end at seven o'clock in the evening throughout the year. They continue with only two hours' intermission for dinner at noon. Two lectures, for different sections, are often going on at the same time. It may be proper to remark that there is a sort of impassable aristocratic barrier between the institute pupils and those of the school of practical agriculture. The instructors of the institute alone bear the title of professors, a dignity rather inaccessible to the tutors and teachers in the lower or school of practice, although these latter often give courses before the students of the institute. This barrier falls, no doubt, when they separate at the close of the course and go out to take their places in society, according to the capacities of each. I am inclined to think it is a fact that the graduates of the lower school are more successful in securing places as stewards and managers of estates than those of the institute, many of whom have to rely on such positions.

Since the establishment of the institute it has sent out no less than 2,944, including those in the school of forestry, or 2,322 agriculturists, and 622 foresters; while from the school of practice, since its opening, in 1818, to 1861, inclusive, the number of graduates is 334, without including some temporary students, a few of whom are taken nearly every year.

THE OTHER MEANS OF INSTRUCTION.—Among the means of instruction presented at the institute may be mentioned, what has already been alluded to, the whole management of the farm, with its experimental fields, the implement manufactory, the workshops, the forests and hunting parks, the nurseries, both native and exotic trees, the botanic garden, the library and the different collections and apparatus designed especially for the purposes of instruction.

The botanic garden was started in 1829, with an area of about ten acres. It was intended to serve the double purpose of instruction and ornament to the surroundings of the chateau. I spent a good deal of time in the various parts of this garden. It is laid out on a generous scale, with an agreeable, park-like aspect; groups of trees, ornamental and useful shrubs, parterres of flowers and lawns well kept. A part of it is devoted to annuals, where an immense number of varieties of wheat and other grains are cultivated; each plot labelled, so that the visitor may know, without a guide, what each contains. In another part are the perennials, especially those of economical value. A grass garden forms a part by itself, where the different species of grass are cultivated in little clumps, each labelled with its systematic and common name; while an arboretum of considerable extent is, at all times, accessible for students and others.

The library contains 4,000 volumes on agriculture and forestry and their auxiliary sciences.

The collections are very extensive and valuable, more so than at any other institute of the kind that I visited. They consist of large collections of soils, manures, models of implements, and implements in full size; admirable collections of wools, kept in glass cases, among which are complete historical collections from the sheep kept on the farm for many years back, especially of the most celebrated bucks and ewes; collections of woods, minerals, petrifactions, &c.; collections of seeds of fruits, herbariums, pathological and zoölogical collections, apparatus used in the lectures on physics, the chemical laboratory, &c.

The course of instruction in the institute embraces a very wide range, and a full detail would lead too far. A general outline may be stated, as follows:—

1. General field and plant culture. This includes a general introduction, the objects of cultivation and the connection of cattle breeding with farm operations; also instruction upon climates, soils, manures, implements, working the soil, multiplication of plants, care of seeds, crops, preservation of farm products, accompanied by demonstrations in the field, the collections of models and machine shops.
2. Special plant culture.
3. Meadow cultivation.
4. Wine, hop and tobacco culture.
5. Fruit culture.
6. Vegetable cultivation.
7. Breeding of general farm stock—embracing domestic cattle and their necessity for man, science of feeding and nourishment, care, uses, multiplication, choice, &c.
8. Horse breeding, including the structure and anatomy of the horse; with the assistance of a large collection of fine illustrations of the different breeds, and excursions made to the various royal studs in the kingdom.
9. Cattle breeding—with demonstrations in the stalls, collections of models and cheese dairy.
10. Sheep breeding, including instruction in regard to wools, demonstrations in the sheep stalls, in the wool and model collections, and in the wool market at Kirchheimer.
11. Swine and poultry breeding, accompanied, also, by practical demonstrations in the pig-sties and collections.
12. Silk culture—including the care and cultivation of mulberries, the proper buildings, the treatment of silk-worms, &c.
13. Bee culture.
14. Practical agricultural instruction—embracing, in general, the duties of steward, landed property in its political and legal relations, position, climate, soil, farm buildings, &c.; capital, labor and, particularly, the organization and direction of a farm; choice of objects, estimation of requirements of manure, statics, nourishment of plants, choice of stock, rotation, farm system,

division of fields, transition from one course of cropping to another, &c.

15. Taxation of farm property.

16. Farm book-keeping.

17. Agricultural technology. This course embraces a year's instruction upon the manufacture of beet sugar, beer brewing and the distillery of brandy in the winter term, and the manufacture of vinegar, starch, the grinding of meal, tile and brick making, and wine and cider making in the summer term, with the innumerable details connected with each.

The auxiliary branches include—

(1st.) Arithmetic and algebra.

(2d.) Theoretical geometry.

(3d.) Trigonometry.

(4th.) Practical geometry, which includes surveying, land measuring and levelling.

(5th.) Estimation of the value of forest lands, beginning with the cubic contents of timber, the growth of single trees, whole forests, &c.

(6th.) Mechanics and physics.

(7th.) Chemistry, in the winter term, general, in the summer, agricultural chemistry, with practice and experiments in the laboratory. The lectures on agricultural chemistry treat, among other things, upon the composition of feeding substances, the theory of feeding, &c.

(8th.) Introduction to geology, the object being to give the student a full knowledge of all those minerals alluded to in the lectures on special geognosy, and which are of more or less importance as elements in the soil, and in organic bodies.

(9th.) Geognosy, science of minerals, composition, adhesion, hardness of rocks, their contents of water, air, warmth, &c. Structure of masses of rocks, groups, systems, &c.

(10th.) Introduction to botany and special economic botany, in connection with which weekly excursions are made during the summer, in the neighborhood of Hohenheim, in addition to which are demonstrations in the botanic garden and the collections.

(11th.) Physiology, anatomy and pathology of plants—their anatomical composition; elementary organs—the different forms of cells; the compound organs, the structure of the root, the stem, the leaves; microscopic demonstrations—life of plants in general, assimilation, secretion; chemical composition of plants—the elements, organic and inorganic; the external conditions of plant life—influence of heat, light and electricity on plants, &c.; internal conditions of life. A pathological collection and a good microscope are constantly used in the demonstrations.

(12th.) General zoölogy, with explanations by skeletons.

(13th.) Special zoölogy, with constant use of the zoölogical collections, in classes, families, breeds, &c.

(14th.) Veterinary science, including the structure of domestic animals, with practical demonstrations.

(15th.) National economy.

(16th.) Laws relating to forests.

(17th.) Agricultural mechanics—building materials, foundations, structures, &c.

(18th.) Drawing of plants.

These courses are so arranged that the pupil can go over their whole range in two terms, or one year, if he has had sufficient preparation at the outset; but generally it requires the regular course of two years of the institute.

The course of instruction begins on the first of October, and the first, or winter term, continues till the tenth of March, when there are three weeks' vacation, after which follows the summer term till the first of September. An examination takes place at the end of each year before the royal commission, when prizes are distributed to such as have distinguished themselves by industry, good conduct and acquirements.

To show how the day is occupied, the following Plan of Studies is posted about the rooms.

*Arrangement of Lectures for the Summer Term,* 1863.

| HOURS. | **Monday.** | **Tuesday.** | **Wednesday.** | **Thursday.** | **Friday.** | **Saturday.** |
|---|---|---|---|---|---|---|
| 6 to 7, . |  | Horse breeding. | General Zoology.<br>Laws of Forests. | Veterinary Science.<br>Laws of Forests. | General Zoology.<br>Laws of Forests. | Veterinary Science.<br>Laws of Forests. |
| 7 to 8, . | Analytical Chemistry.<br>Stereometry. | Wine, Hop & Tobacco Culture.<br>Valuation of Forests. | Wine, Hop & Tobacco Culture.<br>Valuation of Forests. | Agricultural Chemistry.<br>Stereometry. | Technology.<br>Valuation of Forests. | Technology.<br>Special Zoology for Foresters. |
| 8 to 9, . | Architecture.<br>Forest Practice. | Architecture.<br>Protection of Forests. | Agricultural Taxation. | Special Plant Culture.<br>Protection of Forests. | Special Plant Culture.<br>Protection of Forests. | Cattle Breeding.<br>Special Zoology for Foresters. |
| 9 to 10, . | Practical Geometry. | Agricultural Chemistry.<br>Trigonometry. | Agricultural Chemistry.<br>Trigonometry. | Practical Geometry. | Practical Geometry. | Technology. |
| 10 to 11, . | Forest Taxation. | Cattle Breeding.<br>Forest Taxation. | Cattle Breeding.<br>Forest Taxation. | Sheep Breeding.<br>Forest Taxation. | Sheep Breeding.<br>Forest Management.<br>Forest Taxation. | Sheep Breeding.<br>Forest Management. |
| 11 to 12, . | Agricultural Chemistry. | Botany. | Botany. | Botany.<br>Law. | Botany.<br>Law. | Law. |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2 to 3, . . | | Forest Excursions and Reviews of Lectures. | Agricultural Demonstrations.<br>Forest Botany. | | Silk Culture. | Silk Culture. | Agricultural Demonstrations.<br>Forest Botany. | Demonstrations in Fruit Culture. | Forest Excursions and Reviews. |
| 3 to 4, . . | | | Geognosy. | | Geognosy. | Geognosy. | Geognosy. | | |
| 4 to 5, . . | | | Practice in Agricultural Taxation. | Drawing of Plants. | Botanical and Geognostical Excursions. | Field Measuring. | Vegetable Culture. | Farm Practice. | |
| 5 to 6, . . | Vegetable Culture. | | | | | | Agricultural Demonstrations. | | |
| 6 to 7, . . | | | Horse Breeding. | | | | | | |

Work in the Chemical Laboratory in the afternoon of Mondays, Tuesdays and Thursdays.
Special hours assigned for Bee Culture.
Library is open Tuesdays and Fridays from 1 to 2 o'clock.

The Cattle.—It was thought that no race of cattle, that did not unite the different good qualities in the highest degree, would be adapted to the wants of Hohenheim; and no race prominent for one quality, as for instance, for milk, the yoke, or beef, would answer the necessity. After a fair trial of the Dutch, the English, the black and white Bernese, the Swytzer, the Montafoner, the Allgäuers, the Hungarians, the Triesdorfer, the Ansbacher, the Haller and the Limbourger, it was found that the qualities most desired, were united in the greatest degree of perfection in the Simmenthalers. Since their first introduction, in 1835, they have constantly increased; and now the whole herd, except one, of from 80 to 100 head, are either pure, or nearly pure bred Simmenthalers. The Allgäuers are admitted to be better for milk; but, taking color and all other characteristics into consideration, the Simmenthalers carried the day. No experiments are now made to test the comparative merits of different breeds, either at Hohenheim, or at any other agricultural school that I visited in Europe.

These cattle are all uniform in color, of a yellowish or tawny brown, approaching to red. They have mostly been raised on the farm, from fourteen cows and two bulls, which were selected in the Canton of Berne, in Switzerland, in 1835; and a second purchase of sixteen cows and two bulls, in 1838; and a third, of seventeen cows in 1844. The horn is short, the skin yellow, soft and mellow to the touch, mostly good handlers; the barrel large, the quarters well developed, back straight, chest full and well formed. The head is somewhat inclined to be coarse in many of them, as well as the dewlap; while the shoulders and neck also of the bulls are too large and coarse. The males are inferior to the females in the form and structure of the fore-quarters, head, neck and shoulders. They weigh from 1,200 to 1,350 pounds, some considerably exceeding that. Prof. Rau informed me that they would average about 1,300; but the whole stock is weighed every year, and the average weight depends a little upon the condition of the cows at the time of the weighing, the number in calf, the quality of their feed at the time, and other circumstances. In 1847, for instance, 78 weighed 69,607 pounds. In the spring of 1859, 104 head weighed 88,920 pounds, an increase of 19,213 pounds. The general average of all the weighings, between 1846 and 1862, gave 1,240 pounds; but the weight has no doubt been increased by the good keeping at Hohenheim, and exceeds that of the animal on its native mountain pastures. The bulls often weigh as high as 1,800 to 2,000 pounds.

All the cattle, except, of course, the working oxen, are kept in stall the year round. The stall is roomy, high, light and dry,—263 feet long—with a roof of sloping boards. The standing-platform is stone, cemented, with channels behind for carrying off the drainage. The cows stand in two rows, head to head, and between, through the whole length, there is an elevated passage-way, ten feet wide, for feeding, with troughs made of oak plank. No fodder racks are used. The stable is about forty feet wide. The windows are large, with iron frames, easily opened and shut. The doors are also arranged with slides, to secure ventilation. Just outside are sheds for cutting the green fodder, as it is brought up—an old man and a stout peasant girl were kept at work, in cutting vetches and clover, nearly all the time I was there.

The feed is green; taken fresh from the field, from the beginning or middle of May till the end of October; consisting of rye, lucerne, clover, trefoil, vetches, sugar millet, turnip leaves, spurry, &c., alternately. All the food, green and dry, is cut up, so as to prevent any loss. The feeding value of green food to hay, is as one to five. In winter the feeding consists of hay, clover hay, or other dry fodder; beet-roots and straw; malt combs are occasionally fed. Oil-cake and crushed grain are given now and then. The feeding of raw potatoes has become impracticable, on account of the rot. The winter fodder statement shows that 100 pounds of hay are equal, in nutritive value, to 275 pounds beets, carrots and artichokes; to 200 pounds of straw, rape husks, potatoes; to 160 pounds chaff; to 125 pounds beer malt; to 60 pounds oats; to 50 pounds crushed grain and oil-cake.

The following table will serve to show the number of pounds of food of various kinds, and its equivalent in hay, which each animal is accustomed to receive per day:

| STOCK. | Length of Time. | POUNDS. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Hay. | Straw. | Chaff. | Beets. | Malt. | Oil-Cake. | Value in Hay. | Straw for litter. |
| 44 cows, . . | 1st to 17th Nov., . . | 15 | 4 | 4 | 35 | – | 1½ | =35.22 | 6 |
| 2 bulls, . . . | 18th Nov. to 1st Dec., | 8 | 2 | 7 | 45 | 4 | 2 | =36.93 | 6 |
| 39 cows, 2 bulls, . | 2d Dec. to 4th May, . | 8 | 4 | 5 | 45 | 4 | 2 | =36.68 | 6 |
| 37 heifers, . . | 1st to 10th Nov., . | 16 | – | – | – | – | – | =16.00 | – |
| 34 heifers, . . | 11th to 17th Nov., . | 9 | 6 | – | 15 | – | – | =17.45 | 5 |
| 34 heifers, . . | 18th Nov. to 1st May, | 8 | 3 | – | 24 | – | – | =18.22 | 5 |
| 10 calves,* . . | 1st to 10th Nov., . . | 12 | – | – | – | – | – | =18.00 | 4 |
| 8 calves,* . . | 11th Nov. to 27th July, | 12 | – | – | – | – | – | =18.00 | 4 |

* Three pounds Crushed Grain.

From this it will be seen that for the older stock about 36 lbs. of hay or its equivalent are required per day. It has been found that a sixtieth or 1⅔ per cent. of live weight will support the animal without loss, but also without gain, and to provide for secretions, as milk in cows, wool on sheep, it is necessary to double that ration, making it a thirtieth of the live weight or 3⅓ per cent. This is greater than would be required if the cattle had been raised and kept up in condition from birth, as is the case in England, which is no doubt the most economical method. The roots are cut. The oil-cake was formerly softened with water before feeding out, but now, like the crushed grain, fed out dry with a slight mixture of salt, of which 12 lbs. a year on an average, are used per head. The feeding takes place twice a day, morning and evening. Each meal is divided into several small parts, and a new one given only when the last is eaten up. The stock is watered at a fountain outside, between the regular meals. The fountain is a little way off from the stable, so that they get some exercise in going and coming. The young stock is turned daily into a roomy yard close by the stalls. All the stock is curried every day, and kept clean and neat.

It has been found by careful observation that an animal attains its greatest weight of body and greatest yield of milk at 8 years; i. e., after the sixth calf. A cow just before calving weighs 150 lbs. more, on an average, than after calving, and about 200 lbs. more than when dry. The calves usually weigh 80 lbs. and 88 lbs. according to sex. The weight of a calf when dropped is from $\frac{1}{15}$ to $\frac{1}{16}$ of the average weight of the cow. The use of males for breeding is commenced at a year and a half old, but they are not much used till two. In 100 calves $94\frac{1}{2}$ per cent. are living and $5\frac{1}{2}$ per cent. dead. Among 100 calves, $55\frac{2}{10}$ per cent. are males, and $44\frac{8}{10}$ per cent. females. In 100 parturitions, $4\frac{2}{10}$ per cent. are twins.

A form of cattle register is kept as follows:—

| NAME AND BREED. | Sire. | Dam. | Day of Birth. | COPULATION. | | WEIGHT. | | Remarks. |
|---|---|---|---|---|---|---|---|---|
| | | | | Day. | Bull. | Day. | Pounds. | |
| | | | | | | | | |

The form of pedigree register is as follows:—

| No., Name, Date of Birth, Description. | BREED. | | COPULATION. | | REMARKS ON THE CALF. | | | | | WEIGHT OF COWS. | | YIELD OF MILK. | | | General Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sire. | Dam. | Day. | Sire. | Day of Birth. | Race. | Weight. | Quality. | Later Remarks. | Day of Weighing. | Pounds. | Year. | Pounds of Milk. | No. of Days in Milk. | |
| | | | | | | | | | | | | | | | |

An account is kept so that the weight of milk of each cow and each month is seen at a glance, the yield of each noted and the yearly yield noted. The average annual yield per cow is 4,816 pounds. It occurs as follows:—

| | | | |
|---|---|---|---|
| After the 1st calf, | 3,616 lbs. | After the 4th calf, | 4,852 lbs. |
| " 2d " | 4,492 " | " 5th " | 5,308 " |
| " 3d " | 5,048 " | " 6th " | 5,352 " |

After that the yield continues the same for some time, or falls off. It does not increase. The largest yield of any one cow bred at Hohenheim was from a cow which I saw when there. Her weight was about 1,200 pounds. She gave in one year nine thousand six hundred and seventy pounds, in the year after her fifth calf, at the age of eight. The general average yield of milk is four times the live weight of the cow each year.

The milking takes place twice a day at the time of the morning and evening feeding. The average time of going dry is three months; the number of milk days, 275. The milk is sold to a dairyman and cheese-maker.

Young stock, not wanted on the farm, is sold at public auction twice a year, in May and October. The average price for bulls from a year to a year and a half old, is $58.47. The highest price for any one animal was $172.20.

The raising of calves is artificial from birth. They are taken from the dam and fed from the pail. They do exceedingly well; the cow is less disquieted and the trouble is less than if the calves suckle the cow. The latter is allowed some days with young cows after the first calf till they get used to being milked. The amount of food given is:—

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1st | week, | daily, | 12 | pounds of milk, | – | pounds of oatmeal, | – | pounds of fine hay. |
| 2d | " | " | 16 | " | – | " | – | " |
| 3d | " | " | 20 | " | – | " | – | " |
| 4th | " | " | 22 | " | – | " | – | " |
| 5th to 7th | | " | 22 | " | ½ | " | ½ | " |
| 8th | week, | " | 24 | " | ½ | " | ½ | " |
| 9th | " | " | 20 | " | 1 | " | 1 | " |
| 10th | " | " | 16 | " | 2 | " | 3 | " |
| 11th | " | " | 12 | " | 2 | " | 6 | " |
| 12th | " | " | 8 | " | 2 | " | 10 | " |
| 13th | " | " | 4 | " | 3 | " | 10 | " |

In the ninth week the milk is first mixed with water and a little fine oatmeal. The meal is after that mixed with the dry fodder. After three months the milk is withheld, and then the young animals receive daily, till two and a half years old, from twenty to twenty-two pounds of hay, or its equivalent. But the calves never after receive, even in summer, any but dry food, till they are nine months old. The average feeding is so divided that the younger portion receive less, the older more, till two and a half years, when they begin to receive the regular rations of the older cattle, including the grain fodder as indicated above. The growth with this treatment is so remarkable that it is only a little surpassed by the rapidly maturing Shorthorns.

The average weight of heifer calves at 3 months is 233 lbs. Bulls, 353 lbs.
“ “ “ 6 “ 357 “ “ 472 “
“ “ “ 1 year 640 “ “ 750 “
“ “ “ 2 “ “ 1,180 “ “ 1,300 “
The daily increase of a heifer calf is 1.5 lbs. Of a bull calf, 1.8 lbs.
“ “ “ in the 2d year is 1.4. Of a bull, 1.5 lbs.

Few animals are fattened except working oxen, and now and then a cow that goes dry. At the commencement of winter, when the work is over, about twelve oxen are usually fed for beef. The process never exceeds four months. The oxen receive daily, 10 lbs. of hay, 6 lbs. of straw, 25 lbs. of beets, 45 lbs. of beer-malt, 4 lbs. of oil-cake ; in all 66 lbs. of hay or its equivalent, and 6 lbs. of straw for litter, a day. The average time of feeding for the last four years was one hundred and twenty-three and a half days. The increase per head in this time was three hundred and two and three-quarters pounds, or two and one-half pounds a day on an average, live weight. For each one hundred pounds of hay, or its equivalent, fed out, the animal took on 3.64 pounds live weight.

From what has been said it will be seen that all the feed of stock, the dry and green forage, straw, &c., is cut, mixed or macerated. This is the case, with very few exceptions, all over Germany.

THE SHEEP.—Hohenheim undertook to improve the sheep of the country by breeding and furnishing suitable bucks. The object was a breed tolerably rich in wool and size of body, hardihood and capacity for supporting themselves on mountain pastures in summer, and dry pastures and the sheepfolds in winter. These qualities it was difficult to find in any known breed, and to get one was the problem to be solved. Very fine woolled sheep, and sheep eminently adapted to mutton, were the exceptions, and did not sufficiently unite all these qualities. The characteristic sheep of the country is a wool-mutton sheep, got from a cross of the Merino with the German sheep with a live weight of 90 to 100 lbs, and a clip of 3 lbs. of No. 2 to No. 4 wool, which had the character partly of a cloth and partly of a combing wool.

The fat bucks of this so-called grade sheep, which exhibited different degrees of improvement, yet having attained such similarity and fixedness of type as to be designated abroad as the Würtemberg race, have created considerable demand in trade, especially for France. The demand for mutton sheep, in the last few years, and the keeping of sheep for their manure, has greatly increased, while the demand for extremely fine cloth wool and carding wools has fallen off, partly on account of fashion and of the wool manufactures, partly on account of a want of docility and endurance of folding of such sheep. The Electoral flocks have become less and less, their places being supplied by coarser and heavier fleeced animals. The result of this change has been the increased importance of mutton producing sheep, and the production of a cross breed in Hohenheim with the older Merino basis, in the years 1854 and 1855, and since. 45 native ewes in lamb by a fine buck were bought and 24 English Merino ewes put with them, which came from a cross of an English buck with long wool and large Merino ewes in 1830. This new breed has now grown up to 200 ewes. The principal bucks used besides that named, were one from Rambouillet, and a third of Rambouillet and English cross-breed.

Besides this English Merino breed, which was kept up from 1822 to 1850, is the so-called Justinger breed. The Duke of Würtemberg effected a purchase in Segovia (Spain) and in the south of France, in 1786, which was bred as the State model flock on the estate at Justinger. In 1822, ten hundred and eighteen of them were transferred to Hohenheim. In 1829 the institute lost the Justinger pastures, and had to stall-feed the flock in summer. The Justingers had a middling fine wool fit for cloths, and were large and sheared heavy fleeces. They improved the flocks of the country. The 45 ewes above-mentioned had come from them. But not only the new breed, but the old Hohenheim Merino flocks contained Justinger blood. In transferring the State breeding flocks to Hohenheim, a flock of the purest Electorals from the Saxon folds, consisting of 83 ewes and 7 bucks, was kept till 1826. They formed the fine Hohenheim Electoral, which was improved by two bucks and four ewes from Upper Silesia in 1846, and had grown up in 1850 to 130 breeding ewes.

The Electoral bucks have been used to improve the Justinger ewes since 1824, and thence are called the Justinger-Electorals. As a result of the cross, the wool became so fine that in 1850 the Justingers and Electorals could be put together. The number of Electoral ewes was thereby increased to 224 head in 1851, while on account of the heavy sale of wool they were reduced to 50 head in 1862.

Another part of the Justinger breed, selected from rich and long-woolled animals, was used for the formation of a fine comb-wool breed and was bred on pure by itself from 1830 to 1841. A comb-wool buck from the flock of Count Schwerin, with long, slender, glossy wool, was bought in 1843—whence the present comb-wool flock of 200 ewes proceeded. They intend to reduce this flock also, on account of the slow sale of the wool.

A third part of the Justingers, from long-woolled animals, was crossed with the long-woolled and mutton English Leicester bucks. From that cross came what they call the English Merinos, in 1830. In the beginning they used pure English bucks, and in 1842, pure Leicesters. The yield of wool not being satisfactory, they put the ewes in 1847 and 1848 to comb-wool bucks. In 1854, this flock, which never much exceeded 20 ewes, distinguished by its broad build, was mixed with the newly-founded cross-breed, as already mentioned. The principles of breeding adopted in the management of this flock had in view the weight of fleece, and weight of body first, with the Electorals fine wool, with the comb-wool breed quantity with softness or pliancy, and strength and gloss. All three flocks are folded, and were put together on the 1st of August, 1862.

| | Ewes & Yearlings. | Ewe lambs of 1862. | Old bucks. | Buck lambs of 1862. | Wethers. | Totals. |
|---|---|---|---|---|---|---|
| 1. Electorals, . . . . | 68 | 12 | 4 | 11 | 1 | 96 |
| 2. Comb Wools, . . . . | 294 | 63 | 19 | 73 | 60 | 509 |
| 3. Grades, . . . . . | 240 | 64 | 42 | 70 | 28 | 444 |
| Totals, . . . . . | 602 | 139 | 65 | 154 | 89 | 1,049 |

The lambs are all numbered by notches and holes in the ears, a few days after they are dropped. A register is kept. Males are used for breeding at a year and a half old, females, at two and a half. A buck usually serves not over 50 and is never allowed over 75 ewes.

Winter lambing was continued from 1822 to 1848. Summer lambing was tried in 1838 with a part of the flock, in order to get a greater yield of wool, the lambs coming in June and July. Now, since 1848, they all come in May and the first half of June. They get, on an average, 69 lambs to 100 ewes. One hundred Saxonies had 63, one hundred comb-wools had 75, one hundred Justingers had 67, one hundred English Merinos had 72, one hundred Grades had 101 lambs. In summer lambing it was found that buck lambs predominated, while in winter and spring lambing the ewe lambs were more numerous. A pair of twin lambs occurs on an average with Grade sheep, in every nine births; with English Merinos one in every 24, with comb-wool sheep one in every 26, Justingers one in every 49, Electorals one in every 60. The average of all is twin lambs in 31 births.

It would appear from this that the farther we go from the highest type of fine wool the more prolific the sheep become. The Holstein sheep, at the international fair, a long-woolled breed from the marshes, had, in some cases, five lambs; in others, four; in others, three; eighteen lambs were dropped and nourished by five dams.

The twins are most frequently of different sexes, but occasionally of the same, and when of the same, two males quite as often as two females. As the lambing time approaches, the ewes are separated from the rest of the flock by hurdles, and kept apart some days after. At four weeks old the lambs are separated part of the time from the ewes, some hours at first, then gradually for a longer time, until they are allowed together only at mid-day and at night. Castration and cutting the tails take place from three to four weeks of age. At four months old they are weaned entirely and put upon separate pastures. The sheds are so arranged that the different sexes and classes by age can be kept apart. The sheds are roomy, dry, and quite healthy.

The feed in summer is partly on natural pastures, that is, those where the natural grasses grow, and partly on artificial ones, that is, on clover stubble. The pasturage lasts from the fifteenth of April to the fifteenth of November, frequently to the middle of December, or from seven to eight months. The sheep are driven out in the morning as soon as the dew is dried off. At mid-day they are driven under cover some hours; if the weather is hot or bad they lie in the sheds as they do by night, after the afternoon and evening pasturing. The flocks feeding in the neighborhood of the buildings are driven into the stalls; those on more distant pastures into sheep-houses.

The winter feeding lasts from the twentieth of November, on an average, to the fifteenth of April. It consists of hay and straw, roots and shorts. Bucks receive in addition some oats when put to service. The orts of the fodder straw are used for bedding. The distribution of the winter feed is as follows:—

217 Electoral ewes and comb-wool sheep receive daily, from the 2d of December to the 13th of April—133 days—1½ pounds of hay, ¾ pound of straw, 1¼ pounds of roots, ¼ pound of coarse ground grain. In all 2.82 pounds of hay or its equivalent. 70 yearling ewes get the same feeding from December 2d to April 6th, or 126 days. 168 lambs of the same breed get from December 2d to April 6th, 1½ pounds of hay, 1 pound of straw, ⅙ pound of coarse ground grain, equal to 2½ pounds of hay. 16 bucks of these breeds get in the same time 2½ pounds of hay, ¾ pound of straw, 1¼ pounds of roots, ½ pound coarse crushed grain, or 4.32 pounds of hay or its equivalent. 140 cross-bred ewes, from the 2d December to the 13th April, get 2 pounds hay, ¾ pound straw, 1¼ pounds roots, 1¼ pounds grain, or 3.32 pounds hay or its equivalent. 52 yearling ewes, from 2d December to 6th April, get 2½ pounds hay, ¾ pound straw, 1¼ pounds roots, ¼ pound grain, equal to 3.82 pounds of hay. 113 cross-bred lambs, in the same time, get each 2 pounds hay, 1 pound straw, ¼ pound grain, equal to 3 pounds hay. 23 bucks, in the same time, get each 3 pounds hay, ¾ pound straw, 1¼ pounds roots, ½ pound grain, equal to 4.82 pounds hay.

The arrangement is as follows: In the morning the sheep get hay, then water is let into round troughs in the stall. At 10 o'clock, cut roots: at noon, hay, then drink again. In the course of the afternoon, cut roots, and at evening, straw. Once a week they get salt at evening, after the feeding, half an ounce a head.

The health of the flocks is remarkable, diseases very rarely attacking them. The loss is frequently no more than a quarter of one per cent. a year. The sheep are washed early in June. The shearing is done by women on contract at four kreutzers (or a trifle less than six cents,) apiece. The fleece of each sheep is accurately weighed, and the weight entered in the register. Then the fleeces are bound up singly, those of the different breeds being kept apart. On an average of eight years, the Electorals shear 2 lbs. 3½ oz. The comb-wools shear 2 lbs. 10½ oz. The grades, 3 lbs. 3¾ oz.

The live weight of bucks of the Electoral breed is 120 lbs.; of ewes, 76 lbs. Of comb-wool bucks, 135 lbs.; ewes, 84 lbs. Of grades, 160 lbs.; ewes, 91 lbs.

The oily gum in the fleeces of the three breeds is easily soluble, and the washing makes the wool beautifully white. Dust, sand and dirt cling to the fleeces of these sheep and the washing, therefore, is followed by a considerable loss of weight. An experiment made to ascertain the average loss resulted as follows:—

The Electoral sheep lost, on an average, 4 lbs. or 63 per cent. in washing on the sheep, and at the manufactory, 12.3 per cent., making in all 75.3 per cent., and leaving 24.7 per cent. of thoroughly cleansed wool. The comb-wool sheep lost 2 lbs. 13 oz., or 50 per cent. on the fleece, and at the manufactory, 12.7 per cent. In all 62.7 per cent., leaving 37.3 per cent. of clean wool. The grades lost 5 lbs. 14 oz., or 66 per cent. from washing on the fleece, and 9.5 at the mill. In all 75.5 per cent. leaving 24½ per cent. of pure wool.

The Experimental Field was designed, not only as a means of instruction for the students, but also as a means of investigation on the part of the professors. For this purpose the plots appropriated to each experiment, consist of nearly a quarter of an acre each; a size sufficient to give to each a fair and full trial in management, manuring, cost of culture, results, &c. The fact that there are ninety-six of these plots, indicates that this part of the enterprise receives its due share of attention. It also offers the means of raising a great variety of seeds, which supply the wants of the farm and form an important item in the receipts of the institute; while it secures to the farmers of the country a certain source, from which they can obtain pure seed. But the experiments on the farm are not wholly confined to this field. Among those that have been tried, the following may be mentioned:—

1. Upon the transmission of caries in grain, and the influence of washing, soaking, fermentation of the seed on the stock, as well as on the age and change of seed.

2. Observations on the sensitiveness of growing plants to frost.

3. On the effect of large, middling-sized and small seed potatoes.

4. On plucking off the blossoms of potatoes.

5. On the exhaustion of land by rape culture.

6. On the exhaustion of wheat in comparison with green plants and fallow.

7. On the culture, year after year, of beets on the same land, by constantly fresh manuring.

8. On the continued culture of artichokes, on the same land, with manuring every three years.

9. On the effect of mowing, or not mowing, the late clover stubble in autumn.

10. On the depasturing of winter barley.

11. On the manuring of meadows.

12. On manuring with Peruvian, Baker's Island and fish guanos; rape meal, bone meal, super-phosphate, Chili saltpetre, salt, gypsum, gas lime, soda, peat ashes, Liebig's patent manure, artificial manures.

13. On the effect of fresh and rotted manure, the mixture of various crops, and many others.

This field was very instructive and interesting. The crops upon it, when I was there, were in full growth, including a large number of varieties of wheat.

Management of Manure.—There are two great manure pits, one to receive the contributions from the stalls for cows and young stock, and the other those from the horses, oxen and fatting cattle. The liquid manure is received into cisterns, whence it can be pumped up and thrown upon the manure heap, or run down into the basins in the botanic garden.

The manure is carried from the stalls on wheel-barrows and added to the heap; which is carted off usually every week, so as not to ferment and lose its value. When this is impossible, owing to bad weather, or the press of other and more important work for the teams,—as during harvesting—the manure heap is sprinkled over, from time to time, with plaster of Paris. It never remains so long as four weeks in the bulk, except during the harvest and fall seeding, and the rule is to cart it off regularly every week.

The manure, as it is carried out, is immediately spread, that it may not rot in small heaps, or be washed and unevenly distributed. If it comes directly upon the stubble field, it is ploughed under with the stubble; if upon ground already ploughed, it remains lying spread out upon the surface, till the proper time for ploughing comes. If the land is frozen, the same is done; and it lies till the land is ready for the plough. The same course is pursued even when the ground is covered with snow; the manure is spread upon the snow, so that it immediately freezes and does not rot without a covering. The whole management is designed to have the manure, when it is possible, rot in the soil, and not in heaps upon the surface. Fermentation of manure above the surface is prevented, as far as it can be, so that the gaseous products may be developed in the soil and held fast by it.

In the sheep pens the manure remains lying a longer time. Under the treading of the animals in the close space, less goes to waste than in open heaps, yet here and there where there is danger of this, gypsum is spread over the manure, and whenever a sufficient store is collected, this also is carted out.

In summer, and commencing about the 20th of April, a part of the sheep are penfolded by means of movable fences, and in rains and great heats, they are driven under sheds or into stalls, where they are furnished with litter. The finer ewes with their lambs are folded at night in the stall till weaning time, and after the rowan harvest, the ewes are let upon the inlying meadows, but the lambs are not turned upon them till the following year. The pen is the best mode of managing and applying this manure, because nothing is lost, and the urine of the animal, which in the stall mostly escapes as ammonia, is saved. They attain also with manuring by means of the penfold more than three times as much as by the stall dung which is produced by the same number of animals in the same time.

The preparation of compost is not so extensively carried on now as formerly, because the carting to and fro costs too much. The compost heap is very conveniently placed near the buildings. It is in a circular basin hollowed out four to five feet deep, to which on two opposite sides there is an entrance and exit, with edges four or five feet high, over which all the material is thrown, in layers upon the bed of the circular heap. In the circle there is a passage-way left, where the carts are loaded in carrying away the compost. The whole is surrounded by trees, and on the side of the entrance there is a stone ash house. To this compost is added all the rubbish from the workshops, the barns, and of special crops, as the stalks of seed roots, turnips, beets, &c., hop vines, street sweepings, the contents of privies, &c., such organic matters, especially, as decay too slowly to have much value applied directly to the field, or which decay too quickly and lose too much before they are wanted, as the night soil, or substances containing the seeds of weeds. Stable manure, which is brought directly upon the fields and mowing lands, is never added to this compost heap. To these materials only so much loam is added as is necessary to hold the gaseous products of their decay, that is, the compost must never smell, and it will not, if it is all covered over with earth. More earth than is necessary to effect this object is of no use, and only makes a useless labor of hauling to and from the heap, and loading and unloading twice over. Urine is an exception, as it is sometimes brought and thrown upon the compost, when it becomes necessary to accelerate the decomposition of the materials. The heap is not forked over, as this is too expensive, and as it lays in horizontal layers of organic materials and earth, they are cut down perpendicularly as they are carted off, so that the mass becomes thoroughly mixed and uniform.

Both the cisterns for liquid manure above alluded to are from time to time let off into the basin in the botanic garden, which lies at some distance off on a lower level, and the liquid is thus distributed by means of water, over the grounds, which saves all expense of cartage. Some of the urine is carried by means of the barrel on wheels into the vegetable garden and the experimental field, for certain plants, as cabbage, tobacco, &c., and rarely upon the compost heap.

The ashes from the many stoves of the institute, amounting yearly from 150 to 200 bushels, are spread upon the meadows and the poorer spots of lucerne.

Gypsum is not much used, except to strew over the manure, with which it reaches the fields, since in a series of years but little influence has been traced, on clover and lucerne, though previous to 1860 it had always been more or less used, and where used it neither appears in the soil nor was it observed in the greater yield of crops.

Lime ashes from the brick-kiln, all that can be had, are applied to worn-out soils with the best results, especially in connection with the manuring for rape seed. But two to three hundred bushels can be had.

The mud or settlings, in the mill pond, is very rich, and is taken out every six or seven years, amounting to 250 cart-loads. The yard where the young stock is allowed to run, at certain times, is supplied with rape-stalks, old straw and some similar substances, and the rakings from it are put upon the compost heap, and with that upon the fields.

No manures are bought for the farm, but they sometimes spend from 60 to 70 florins, or 25 to 30 dollars, a year for horn-shavings and wool-waste from the manufactories, for the trees in the nurseries.

I might give much more extended details of the foregoing and many other branches of this institute, and its management of the great estate on which it is located, but what has been said will serve to show with what degree of system and care the whole establishment is carried on, and how useful such experiments and details here might be made to the farming community. Each school, properly conducted, would become in fact a great experimental station, the results of which would serve, in a measure, to educate the whole community, as well as the students who might have the more direct advantages of it.

The number of students in the higher institute at the time I was there was 150. The ancient riding-schools, with ceilings adorned by splendid fresco paintings by some of the first artists of the last century, are now used as barns for the storage of grain.

The collection of implements at this school is, I think, the most extensive and instructive of any I saw in Europe. The collection of models is also very large and well arranged. The students in the lower school, or school of practical farming, have a lecture from 5 to 6 in the morning, then work from 7 to 11½, and from 1 to 6½ or 7. They have another lecture or study from 8 to 9 o'clock. The time devoted to study and instruction is increased in winter and during rainy days. They are the sons of peasants well off in the world, having enough to rent or buy a farm. They enter for three years and are not admitted for a less term.

The sheep are regarded as about the most profitable branch of the farm.

This institution is practically self-supporting. It receives ten thousand florins a year from the government. That is equivalent to a little over $4,000, but I was told that with a hundred students it could pay its way.

### WEIHENSTEPHAN.

The Agricultural Institute of Weihenstephan holds the first rank in Bavaria. It was modelled, apparently, after that at Hohenheim. It is situated at the little old town of Reising, some twenty miles from Munich, on what was originally, I believe, a part of the public domain of Schleissheim, the royal buildings of which domain lie within six or seven miles of Munich, and where there is still a school of practical farming similar to the *Ackerbauschule*, or peasant school, at Hohenheim.

The location of the school and farm of Weihenstephan is very fine. The immense buildings stand on a beautiful hill, overlooking a wide extent of country, and within fifteen or twenty minutes' walk from the railway station. I arrived there from Ratisbon on a bright summer morning, introduced myself to the first man I met, told him my object and learned at what hours the various lectures took place, attended two or three of them and became acquainted with the professors, visited and examined the collections, the stables, the brewery, the farm and experimental field, the sheep, &c.

The estate lying in connection with this institute comprises, I believe, about 650 acres, of which there are usually about 80 in wheat, over 40 in rape and root crops, about 35 in oats, 12 to 15 in potatoes, 15 to 20 in rye, 18 to 20 in barley, 8 to 10 in beans, 5 in hops, about 130 in fodder crops, such as lucerne, clover, vetches, &c., while about 150 are in mowing fields and so on. The land is of excellent quality.

The stock consists of 12 horses, 22 pairs of oxen, 59 milch cows, 7 young cattle, 30 swine, and 570 sheep. The cows are mostly of the Allgäuer and Mürzthaler breeds, which are considered best for milk after the Dutch. The cross with the Allgäuer and Swiss, they say, makes fine working oxen.

The buildings form a series of parallelograms, enclosing a great grassy court, around which are arranged the various departments, as the chemical laboratory, the rooms for study, &c. Around a second court are the cattle barns, the dairy and stables, the granary, the brewery, the plough manufactory, &c. There are, also, various other establishments, a distillery, a flour mill, &c.

The number of students is about seventy. The course of instruction does not materially differ from that at Hohenheim.

During the summer term, for instance, there were lectures by the Director, on soils, their origin, the different kinds of soil, weathering, irrigation, drainage, division and natural classification ; The comparative value of soils for the production of plants ; Circumstances which modify this value ; The soil differs according to the coarseness of its particles and its tenacity ; Sand, loam, clay, marl and humus ; Subdivisions of soils ; Taxation of mowing lands, pastures, gardens, vineyards, swale lands, fisheries, &c. ; Double-entry book-keeping as a check upon farming operations.

Dr. Riederer lectured upon the following topics :—

1. Introduction to agricultural practice, idea and object in general and the systems of Thaer, Thünen and Liebig.

2. The positive and negative means of a good farm management, as the judicious division of land, proper number of laborers, education of the farmer, necessary capital, &c.

3. Advantages and disadvantages of large and small estates. Influence of a judicious regulation of the corn trade, at home and abroad, on the profits of farming, &c.

4. The most important directions in regard to keeping animals and the proper estimation of their products.

Text-books are used in connection with the lectures.

Professor Knobloch lectured three hours a week upon—

1. Agricultural Chemistry.—Chemistry of fermentation, decomposition, formation of humus. The chemical contents of manure, excrements of birds, solid and liquid excrements of man and animals, strawy materials, disinfection. The chemical principles of the preparation of composts. Bone manuring, phospho-

rites, and koprolites, gypsum, wood and peat ashes. Manuring with oil-cakes, ammonia, and nitric acid salts. Fish guano. The formation of soil through the culture of agricultural plants. The chemical principles of fallowing and rotation. Drainage. Chemical analysis of soils and kinds of manure, the ashes of plants, of spring and running water, and of different agricultural products. On Liebig; Chemistry in its application to agriculture and physiology, &c.

In connection with these lectures, the chemical laboratory was open daily during the term, and the students worked industriously in it, in making analyses of soils, manures and ashes, milk, potatoes, feeding materials and cereals, sulphuric acid and phosphoric acid determinations, &c.

2. Agricultural Technology.—Four hours weekly. Fermentative processes of the beer brewery, the brandy distillery and vinegar manufactory in its whole range. Making of butter and cheese, making of starch, and the application of the latter to the production of sago. Lime and brick burning. Turf cutting.

*Technological Practice*, four half-days a week in the winter term, and one half-day in the summer term. Manufacture of Bavarian normal and strong beer, potato, grain and maize brandy, vinegar, starch, &c. Demonstrations in the brandy distillery, the cheese dairy, the brick-yard, at the lime-kiln, and on the turf or peat meadows. Investigation of various raw materials and fabrics. Agricultural technological mechanics. Excursions to farming estates in the neighborhood.

Professor May gave lectures in the winter term, five hours weekly, upon—

1. The anatomy of the horse, the sheep and the swine, with demonstrations by skeletons and preparations.

2. Physiology of domestic animals, in connection with the feeding proper for them.

3. The races of the larger farm animals. Study of the different races, breeds and families of improved domestic animals, their form, characteristics and useful qualities.

4. General principles of the production of animals. Methods and principles of breeding. Green, dry, root, bulb and corn fodder. Wastes of the farm. Loss and injury from particular feeding materials. Comparative composition of different mate

rials, and their nutritive value. Preservation, economy and production of fodder.

*Summer Term, four hours a week.*

1. Swine-breeding. Choice of animals. Pregnancy and care of the litter. Parturition. Treatment of the dam and pigs. Close confinement. Keeping at pasture. Fattening.

2. Horse-breeding. Study of the subject from an agricultural and a national economical point of view. Choice of draught horses. Pairing. Treatment of the mare in foal. Handling of colts during the first, second, third and fourth years. Checks in the development.

3. Knowledge of wool. Its normal and abnormal conditions.

4. Importance of a knowledge of veterinary science in the treatment of domestic animals.

*Second Course. Winter Term, four hours a week.*

1. On wool, (continuation.) Wool staple. The wool fleece. Evenness of wool. Cloth and comb-wools. Working of Wool.

2. Sheep-breeding. Choice of animals. Numbering and classification of sheep. Treatment of ewes in lamb. Time of lambing. Management of the young. Pasturing sheep. Washing and shearing. Sorting of wool. Treatment and sale of wool. Fattening. Valuation of the fodder used in sheep husbandry.

3. Cattle-breeding. Choice and selection of animals for breeding. Deviations from the normal presentation. Suckling and artificial raising of calves. General management in all cases.

4. External diseases of the larger useful farm animals.

5. Shoeing. Treatment of the ordinary breaks and diseases of the hoof.

*Summer Term—Five Hours a Week.*

1. Cattle breeding (continued.) Stall and pasture treatment. Use of cattle—milk, fattening and draught. Valuation of fodder to be used.

2. Knowledge of the exterior of the horse.

3. Knowledge of the exterior of cattle.

4. Internal diseases of domestic animals. Contagious diseases and their origin.

Practical exercises of judging correctly of animals, on the part of the students, also of wool; the true modes of breeding and the diseases of stock are constantly enforced.

Prof. Lidl lectures, in the winter term, on—

1. Cursory view of the geognostical relations of Bavaria.

2. Agronomy. Mould and subsoil, humus, sand, clay, lime, gravel and alluvial soils. Local aspects and their influence on vegetation.

3. Agriculture. Cultivation—working of the soil by cultivation, by different implements. Improvement of soils.

4. Anatomy and physiology of plants. Cells and vessels of plants. Difference in them. Contents of cells. Plant-cells in their various relations. Intercellular tissue. Nourishment of plants. Motion of the sap. Production by seeds and spores. Diseases of vegetation.

5. Morphology. Root, stem and leaf organs, flowers, fruits and seeds.

*Summer Term.*

1. Special plant culture—grain fodder and root-plants.

2. Economical botany. The most important weeds and poisonous plants.

*Second Course—Winter Term.*

1. Fruit culture.

2. Cultivation of special plants, root, commercial and coloring plants.

*Summer Term.*

1. Culture of special plants, grains, pulse and oil fruits. Fodder plants and tubers.

2. Wine growing.

3. Continuation of lectures on botany.

Two botanical excursions are made each week in connection with this course.

Prof. Döhlemann lectures, in the winter term, on—

1. Applied mathematics. Recapitulation of the most necessary principles of algebra, geometry and stereometry; calculation, division and alteration of surfaces; calculation of the cubic contents of different bodies.

2. General architecture. Earth and foundation work. Construction of ore pits. Restoration of hewn stone and brick-wall work. Stone binding for pillars. Chimney flues, &c.

3. Practices in drawing. Drawing of situations. Copying and sketching of simple agricultural buildings and parts of buildings. Drawing of agricultural implements and machines.

### *Summer Term.*

4. Continuation of general architecture. Construction of different kinds of vaults; ornamental works; carpenter's work; joiner's and locksmith's work.

5. Surveying, with exercises in the field. Explanation of the most useful instruments for length and angle measuring. Solution of different problems of practical geometry, on the field and in practice.

### *Second Course—Winter Term.*

1. Agricultural Architecture.—Laying out and construction of houses and stables. Buildings for the preservation of agricultural crops, &c.

2. Meadow Management, with practical exercises.—Theory and use of different levelling instruments. Water measuring. Improvements of fields in general. Drainage. Irrigation. Practice in levelling and water measuring.

Prof. Meister lectured, in the winter term, three hours a week, on physical geography, the atmosphere and climatology. The barometer, thermometer, hygrometer, and psycorometer. Effect of clearing off of forests. Relations of temperature to the atmosphere and the earth, and the consequent distribution of plants. Peculiarities of land and sea climate, and their causes. Winds. Warmth and moisture. Amount of rain, dew, number of rainy days, storms, fall of hail, and their distribution over the year, and the consequent physical characteristics of the soil. Explanation of the century calendar, and of the so-called rules for determining the weather. Temperature of the soil. Observations at different depths. Barometrical and thermometrical measurement of hights. Construction of sun-dials.

Judge Schleisinger lectured in the second course twice a week, in both terms, on the general German agricultural law in regard to the more important private rights and later laws in regard to cultivation.

This course was comprehensive, embracing the general principles of rights, persons and things, and the laws affecting property, real and personal.

The royal master of forests, Bierdimpfel, lectured in the winter term on the introduction to the management of forests, the structure of woods, plants, and their relation to the air, climate and soil, and on the definition of the technical forest expressions.

### *Summer Term.*

On forest cultivation, protection of forests. These courses were illustrated by excursions into the neighboring forests belonging to the government.

In addition to the short and frequent botanical and other excursions in the neighborhood, long excursions are made, from time to time, to various parts of the kingdom, the students being accompanied on them by one or more professors. Special subjects are assigned to some one or more of the class on which to write out a detailed report. As an example, the last great excursion which took place previous to my visit was made to Northern Bavaria, to Nürnberg, and so round to Augsburg, to visit the wool market in that city. In the former city, there was, at that time, a great meeting of Bavarian farmers for the discussion of agricultural topics; an agricultural convention, in other words. That was taken into the trip. That part of the kingdom, as well as Franconia, through which the direction lay, is largely devoted to the culture of hops. Now two of the students were appointed to write out an account of the journey in general; three to write on the culture of the hop; two on fruit culture, as seen in the excursion; another on irrigation; another on garlic-land; another on the art of manuring; four others on cattle; two others on the visit to Lichtenhof Agricultural School; another on bees; two others on the wool market, &c. A full report of the excursion is thus made, mostly written by the students themselves, and printed in connection with the annual report of the school.

The arrangement of the hours for the lectures at this school, is as follows:—

*Arrangement of the Lectures, Winter Terms,* 1862 *and* 1863.

| Days of the Week. | Forenoon. | | | | | | Afternoon. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 8 to 9. | | 9 to 10. | | 10 to 11. | | 2 to 3. | | 3 to 4. | |
| | 1st Course. | 2d Course. | 1st Course. | 2d Course. | 1st Course. | 2d Course. | 1st Course. | 2d Course. | 1st Course. | 2d Course. |
| Monday, | Agricultural Chemistry. | Special Cattle Breeding. | Forestry. | Technology. | Anatomy & Physiology of Animals. | Management of Forests. | Agricultural Practice. | Technological Practice. | Agricultural Practice. | Technological Practice. |
| Tuesday, | Applied Mathematics. | Agricultural Practice. | Agricultural Chemistry. | Special Cattle Breeding. | Theory of Agriculture. | Agricultural Architecture. | Physical Geography. | Technological Practice. | Anatomy & Physiology of Animals. | Agricultural Law. |
| Wednesd'y | General Architecture. | Technology. | Theory of Agriculture. | Agricultural Practice. | Religion. | | Physical Geography. | Forest Excursion. | Agricultural Mechanics. | Forest Excursion. |
| Thursday, | General Architecture. | Technology. | Anatomy & Physiology of Animals. | Agricultural Practice. | Theory of Agriculture. | Veterinary Science. | Agricultural Implement and Plant Drawing as a part of Technological Practice. | | | |
| Friday, | Applied Mathematics. | Special Plant Culture. | Anatomy & Physiology of Animals. | Technology. | Theory of Agriculture. | Special Cattle Breeding. | Physical Geography. | Technological Practice. | General Plant Culture. | Agricultural Law. |
| Saturday, | Theory of Agriculture. | Agricultural Architecture. | Agricultural Chemistry. | Special Plant Culture. | General Cattle Breeding. | Agricultural Practice. | Agricultural Implement and Plant Drawing as a part of Technological Practice. | | | |

*Hours for the Lectures in the Summer Terms of* 1862 *and* 1863.

| Days of the Week. | FORENOON. | | | | | | AFTERNOON. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 8 to 9. | | 9 to 10. | | 10 to 11. | | 2 to 3. | | 2 to 3. | |
| | 1st Course. | 2d Course. | 1st Course. | 2d Course. | 1st Course. | 2d Course. | 1st Course. | 2d Course. | 1st Course. | 2d Course. |
| Monday, . | Forestry. | Technology. | Chemistry. | Zoology. | Cattle Husbandry. | Forestry. | Forest Botanical Excursions. | Agricultural Practice. | Forest Botanical Excursions. | Agricultural Practice. |
| Tuesday, . | Cattle Husbandry. | Taxation. | Surveying. | Zoology. | Plant Culture. | Mowing Lands. | Work in the Laboratory. | Forest Excursion. | Work in the Laboratory. | Forest Excursion. |
| Wednesd'y | Farm Management. | Agricultural Architecture. | Architecture. | Technology. | Religion. | Religion. | Work in the Laboratory. | Practice in Exper. Field, Bot. Excur. | Work in the Laboratory. | Practice in Exper. Field, Bot. Excur. |
| Thursday, | Cattle Husbandry. | Technology. | Botany. | Zoology. | Chemistry. | Special Plant Culture. | Practice in Exper. Field, Bot. Excur. | Agricultural Law. | Practice in Exper. Field, Bot. Excur. | Leveling Field Measurement. |
| Friday, . | Surveying. | Taxation. | Cattle Husbandry. | Mowing Lands. | Plant Culture. | Zoology. | Surveying. | Agricultural Law. | Surveying. | Fruit, Wine, and Garden Culture. |
| Saturday, | Farm Management. | Special Plant Culture. | Chemistry. | Zoology. | Plant Culture. | Technology. | Practice in Agriculture. | Technological Practice. | Practice in Agriculture. | Technological Practice. |

The nurseries on the farm are extensive and the sales from them profitable; but probably the brewery is the most profitable branch of the establishment. Here are used more than ten thousand bushels of malt a year. In the year ending with July 1st, 1863, it used 3,668 Bavarian scheffel, or about eleven thousand bushels. In the same year over a thousand bushels of potatoes were used in the distillery. There were sold from the nursery, in the same time, 8,520 trees.

Just before I was there a terribly destructive hail-storm had occurred, and I never saw such magnificent fields of wheat and other grain so completely riddled and ruined. It was painful to look upon. It had given promise of an extraordinary yield up to the time of the hail, but it was very nearly a dead loss when I saw it. A committee of appraisers from the insurance company for crops was on to estimate the damages. The widespread system of insurance, of which the institute had fortunately availed itself, saved it from very great loss, which otherwise would have fallen very heavily upon it.

I was indebted to Professors May and Döhlemann for many kind attentions. The director was much occupied with the people who were to estimate the damage of the storm.

I should add that much instruction is given in the field and the nurseries, in the barn and other parts of the establishment, by practical demonstrations. There is a reading-room and a library; there are extensive collections and other appliances.

### SCHLEISSHEIM.

This is now a school of practical farming corresponding to the *Ackerbauschule* at Hohenheim, that is, the pupils are the sons of peasants mostly, and they enter the school to work a considerable part of the time. The number of students at the time of my visit was thirty-four.

This school was founded in 1822 as a higher agricultural institute like Hohenheim, but the lands at Weihenstephan being well adapted to the purposes of a model farm, the higher department was removed to that estate some years ago, leaving Schleissheim, and this latter has since remained as a school of practice. The estate consists of about six thousand five hundred acres, and like many other establishments of the kind, it possesses a fine old royal residence or chateau, the whole lying in an immense, but not very fertile valley. I have seen it intimated that the lands were so decidedly inferior and unproductive that the intention of the government in giving it over to the school to be managed by scientific men was to put the value of scientific principles in agriculture to the severest possible test. I believe, if such was the case, that there has been little reason to exult in the triumphs gained over such powerful natural obstacles as a poor soil and an ungenial climate, and I think it may be taken to be as great a mistake to select land for a model farm, or an agricultural college farm, that is much below the average of natural fertility, as it would be to select one very much above it. In the first case even scientific management can hardly be charged with the responsibility of a failure to produce high crops, and in the latter, it would not get the credit of whatever it did produce. Neither would be a fair test of the skill and science applied to it.

The character of the soil led to the early adoption of a twenty years rotation, in which wheat came in but once, oats five times, rye and barley one year each, grass occupying six years, and one year being given over to an idle fallow.

The buildings are old and immense in extent, arranged in the form of parallelograms with broad open courts or yards between. The whole has an air of majestic desolation. I do not think palaces especially well adapted for the purposes of agricultural schools. The endless stables were partly occupied by horses belonging to the Bavarian cavalry.

The course of instruction is more practical than theoretical, that is, of the time devoted to study and training two-thirds is given to practical work and one-third to theoretical.

The theoretical instruction, which comes mostly in winter and on rainy days in summer, when it becomes impracticable to work out-doors, embraces—

1. Religion. A brief survey of the history of religion and biblical history.

2. Elementary studies, arithmetic, orthography. In arithmetic, the fundamental rules and fractions, exercises in reducing common currencies, weights and measures, and measurements of space. It is especially mathematics applied to agriculture. As large a proportion as possible is mental.

About an hour a week is devoted to orthography, to teach correct writing and language, and to develop facility in writing. It includes examples of receipts, bills, notices, &c.

3. Agriculture. On climate, atmosphere, knowledge and estimation of kinds of soil and their cultivation or working. On machines and implements, their manufacture and repair, the parts of which they are composed and their use, the handling and management of sowing, threshing and cutting machines, to guard against accidents. On the formation of manure heaps and the manufacture of manure, the application of different sorts of manure. On the knowledge of seeds, and the different methods of sowing and planting. The treatment of plants during the period of growth. The reduction of different feeding substances to the hay value. Estimation of the necessary requirements of manure. On the various methods of harvesting, threshing, preservation and drying. On the valuation of fruits. On the arrangement and keeping of simple farm registers. Plan and model drawing from measurement.

Technical Employments.—On milk and the products of milk. On the erection and management of brandy distilleries, and the suitable materials to use.

Culture of Mowing Lands.—Preliminary instruction. 1. Levelling by the application of the level and other instruments. 2. Measuring of level surfaces, lines, angles, and figures; triangles, quadrangles, right angles, the circle, practical exercises in these operations. 3. Laying out trenches and dams for water or irrigated meadows, calculation of bodies of water, and the requirements of water for irrigated meadows. 4. Tools for field culture.

The practical management of meadows. Study of meadow or field plants. Requirements of seed and time of sowing. Seed raising. Manuring mowings with barn and compost manures, with liquid and artificial manures; the hay harvest and its yield. Preparation of brown hay; care and improvement of meadows other than irrigation.

Drainage.—When and how to be applied. The work preparatory to draining.

Cattle Breeding.—Application of anatomy to horse, cattle, sheep, and swine breeding. The various breeds and their characteristics. Explanation of particular methods of improving the breeds of cattle, through the introduction of foreign males, and through in and in breeding, &c.

1. Explanation of characteristics according to the kind of use required, feeding for beef, milk and draught.
2. Choice of animals for breeding, according to age, use, special points.
3. Treatment of the breeding animal,—feeding and care.
4. Parturition. Treatment immediately after.
5. Management of the calf. Methods of raising. Quantity and quality of milk for its nourishment.
6. Feeding, management and care of the young animal up to the period of use.
7. The same of the full-grown animal. Quantity and quality of food for milking, fattening, and working animals. Housing of sheep, product of wool, and the cleansing of it.
8. Adaptation to work.
9. Purchase and sale of animals, especially the horse.

The students are instructed in veterinary manipulations, and so far as possible applied in practice. Bleeding at several points in different animals. Treatment of wounds, &c. Shoeing of horses and oxen.

The proper management of forests, in all its branches, also forms a part of the instruction, as well as that of fruit trees.

Excursions are also made to neighboring estates for the purposes of observation, the results of which are written out by the pupils. Money is sometimes appropriated by the government to defray the expenses of long excursions.

Experiments are conducted in the making of implements, and the application of manures, and the cultivation of plants.

There is a collection of models, a herbarium, a library, and tools, and workshops for repairing the smaller agricultural implements, and the preparation of models. The students are held to a pretty strict line of conduct; neatness, order, and industry are inculcated and required. An examination takes place at the close of the course, and prizes awarded according to merit.

The number of cows kept is ninety; the number of yokes of oxen thirty-six. They make cheese and butter. The age of the students varies from sixteen to twenty. The tuition, board, &c., amounts to about 80 florins, or about 33 dollars. Each student costs the government about 125 florins, but the balance is made up from the public treasury.

The young men are certainly not liable to acquire luxurious habits here. I visited them, by invitation of Professor Anselm, teacher of agriculture, while they were at supper, and had various opportunities for conversation with several of them. Their fare appeared to be what, in our reformatory and correctional institutions, would be called "very hard," and yet they seemed to be quite contented and happy.

I should think the institution well calculated to send out a hardy, frugal, intelligent, industrious class of young men, who might testify with regard to their training as Socrates did with regard to Xantippe, "being firmly convinced that in case I should be able to endure her, I should be able to endure all others."

There is nothing imposing in the buildings or their arrangement. They are substantially built of stone, in low, long ranges surrounding a large yard or open space. There is a blacksmith's and a wheelwright's shop in a part of the range, and many agricultural implements are turned out here by the slow processes of hand labor, some of them excellent, but all rather more remarkable for strength than elegance.

Brown Hay.—They prepare here, and in many other parts of Germany, what is called brown-hay. When the grass is partially wilted, it is collected and spread in layers, and firmly trodden down. It is dried by the heat which is generated in the mow. If the wilted grass is to be thus made into hay, it must be taken when neither too juicy nor too dry. Leaves, heads, and blossoms must remain firmly on the stalk.

In good hay weather, the grass may be cut in the morning, and after being wilted and turned, and after lying six or seven hours, carted in and trodden down. The mow or stack may be from ten to twenty-five feet high. If not high enough, the grass does not generate sufficient heat, and moulds and injures. But if the stack is too high, the weight too great, the hay may become black and mildewed, because the warmth becoming too great, does not find its way off sufficiently fast. If the stack is put up outside the barn, under a straw-thatched roof resting on poles, they round it up very much in the shape of our stacks, not less than ten feet in diameter.

To preserve the hay, the treading must be carefully done, so as to get it as firm as possible, and to have it all trodden down uniformly. The firmer it is the better, and this is regarded as of the first importance, since it heats all the more, and the moisture is more completely driven off, till it soon becomes quite dry.

On the top layer of hay, from six to eight inches of straw is spread, that no mould may attack the hay on the top, and that the evaporating moisture passes into the straw. If the work is well done in building the stack, the hand cannot be pressed into the sides. Within a few days, the heat is so much developed that in thrusting in the hand it is very perceptible.

After five or six weeks, the heat is entirely gone, and the hay is very fragrant, and ready for feeding out. It is of a brown color when so treated, and hence called brown hay. In using, it is cut down perpendicularly with a knife, so that it comes off in vertical layers. It is a perfectly healthy and sound fodder, and is eaten greedily by stock.

The advantages of this method of curing hay are—

1st. That even in rather bad weather, the haying is quickly over.

2d. That the hay is more nutritious than that cured in the usual way. It is estimated as fifteen per cent. better. The reason of this is that with the wilted grass all the blossoms and flowers of the meadow grasses and the finer leaves are secured, which in working over in dried hay are, to a great extent, lost.

3d. That much less space is required to preserve it, because it is trodden so solid. For these reasons, this mode of curing is adopted in many sections. In this method of drying, where the amount of fodder is short, straw may be placed under the stack, in order to improve the straw by means of the heating whereby it becomes more soft and tender, and is relished much better by stock. If bad weather is feared, the grass may be got in much less wilted, and thus preserved by the mixture with straw. The greater moisture present in the grass is divided uniformly with the dry straw.

Bad, or what is called sour hay, if made into brown hay, is much more palatable to cattle, and all the more if a little salt is strewn over the layers.

Grass usually comes into blossom there, as with us, in the latter part of June or by the first of July, and that is regarded as the most suitable time for cutting it.

### LICHTENHOF.

This institute is about a mile from Nürnberg towards the south. It was founded in 1832 by Dr. Weidenkeller. The farm, originally composed of sand and gravel, almost barren, was gradually changed into a good soil, now apparently fertile and productive, by the students.

The stately buildings of the institute stand at the right of the entrance, and on the left the botanic garden. The buildings are in a modern style, contrasting strangely with the antique structures in the neighborhood. The dwelling of the inspector is within the college enclosure, as also that of Mrs. Weidenkeller, and just beyond, the dormitories for eighty students, the lecture rooms, the laboratory, a spacious eating saloon, which serves also as a work room, a library and wash room.

The botanical garden contains all, or nearly all, the agricultural plants, arranged in the Linnæan order, besides many of the more common forest trees. The garden of the institute for the growth of vegetables and fruits also joins the botanical garden. Among the fruit trees stands the monument to Dr. Weidenkeller, the founder. A little way beyond lies the experimental field. The improved grounds near by contain a good nursery of trees. In a little grove, on a knoll, a monument is erected to His Majesty, King Max. A broad space is devoted to ornamental plants and farm crops. The experimental field is about two acres in extent. There is also a hop garden on a piece of reclaimed swamp. This piece was improved by the pupils without much cost.

Near the main building stands a second, which contains the collections. They consist of skeletons and anatomical preparations, a crocodile, birds, domestic game and some malformations, several models of systems of irrigation, collections of insects, minerals, &c.

The stocks of bees were presented by Dzierzon, and therefore of special interest. The mode of operation is easily seen from the arrangement of the hives.

The farm buildings consist of cow and horse stalls, shed and coach house. There were about thirty cows, consisting of Allgäuers and Simmenthalers, a few Ansbachers and Ellingers. The roof of the cow-house is built of wood, the sides of stone.

The instruction at this institute is not strictly agricultural. Much of it, in fact, has no more bearing on agriculture than on any other calling. Religion, the German language, geography, arithmetic, zoölogy and drawing are prescribed studies in the first year. Agriculture and practical agricultural exercises come in for a share of attention, but they don't seem to be especially prominent in the programme.

The second year is a continuation of the first, with a little botany, geometry, mineralogy and history added, while in the third year, agricultural chemistry, farm accounts, rural architecture, machinery, the anatomy and physiology of animals, veterinary, medicine, drawing, riding, fencing and other practical exercises come in and add variety.

This institute ranks as intermediate in the list of Bavarian agricultural schools. It has the advantage of close proximity to the market of the curious old city of Nürnberg, and is, I should think, in a tolerably flourishing condition. Nürnberg is in Middle Franconia, somewhat over a hundred miles north of Munich.

### INSTITUTE AT GRIGNON, IN FRANCE.

I visited this celebrated school in company with Governor Wright, of Indiana. It was a beautiful day in August, and the excursion was, in many respects, highly interesting.

The improvement of the soil of the country, and a cheap production by means of this improvement; the advantageous employment in agriculture of the capital of the country; the continued occupation and elevation of the rural population of France, and the increase of that population, were the principles which led to the foundation of this establishment, in 1829. The great precept of the first director, M. A. Bella, was that the improvement of the soil is the most fruitful source of the cheap production of the necessaries of life.

King Charles X. bought the domain at Grignon, which was selected by M. Bella, and granted it, for forty years, on the following conditions:—

1. To apply a perfected and instructive system of agriculture on the domain.

2. To organize a scientific and practical course of instruction in agriculture.

3. To make all local and needed repairs.

4. To make permanent improvements to the value of 300,000 francs, such as buildings, roads, canals, clearing from rocks, plantations, &c.

5. To improve the lands in addition to the sum named.

6. To renovate the forests on the place.

It was started as a sort of joint stock company on these conditions, which were considered as very reasonable.

In other words, the estate being made over by the government on an appraised or fixed valuation, the subscribers were to furnish the capital to stock and carry on the farm, and to make permanent improvements in buildings, roads, drainage, &c., to the amount of 7,500 francs, or $1,500, a year, in lieu of rent. That amount was considered due, as rent to be paid in this manner. The government at the outset offered no further encouragement.

The subscribers to the fund regarded their stock as an investment, and not as so much given to the public, and they expected a return of interest on the capital invested. It will be seen that here was a difficult problem to solve; the management of the farm in such a manner as to show to the neighborhood and the country that the method adopted was better than others, which was necessary in order to secure for it a proper degree of confidence and respect, and at the same time to hire teachers and keep up the machinery of scientific and practical instruction, and after doing both, to make a net annual dividend to the stockholders.

To meet this somewhat anomalous condition, it was found necessary to be a little economical in salaries to teachers and professors, and thereby to sacrifice to some extent the interests of the people, to whom the value and efficiency of the enterprise as an institute of agriculture was of the first importance. The profits of the farm had to make up any deficiencies in the costs of the school, but the necessity of low salaries made it impossible to secure teachers of the highest talent, while the price fixed for tuition, &c., put it out of the power of many students to attend the course.

The government, seeing very early in the undertaking that the company would be likely to have a hard bargain, very generously offered pecuniary aid in addition to the terms on which the estate was taken, but the director refused to accept it, fearing that it would injure the influence and credit of his farming, as an example or model for others, if it were known that any part of the funds came from sources other than the farm itself. The same objection could not be urged against the salaries of the professors being assumed by the government, and this enabled the school to secure a much higher grade of talent in its corps of instructors, while the terms were reduced so as to increase the number of pupils and the efficiency and importance of the school.

The director, M. Bella,—father of the present director,—in one of his earlier reports, makes the following sensible remarks:—

"Instruction in husbandry may truly be said not to partake of the nature of those branches of education which admit of being pursued in the centre of large cities; it is at once so vast and so complicated, and it stands so much in need of a union of theory with practice, that the chairs created in towns, though they may spread a taste for agriculture, cannot in themselves form expert husbandmen.

"If government were to feel itself called upon to carry on a system of farming operations in all their separate departments, in order to test the soundness of theories by the results of practice, many difficulties would occur in the execution of the task, and a much more lavish expenditure must, if we may trust to general belief, be incurred, than would happen if the same were in the hands of individuals. It is more prudent, therefore, on the part of the State, that it should associate itself with some scheme already in the hands of individuals, and even here its intervention would be prejudicial, if its co-operation were proffered to establishments which did not present in themselves sufficient guarantees, and if the assistance it afforded were not confined within proper limits.

"Thus it would plainly be a fault for it to mix itself up with any scheme, which did not possess the conditions of duration necessary for the accomplishment of its proposed office; or which had not been proved to contain within itself the elements of success; or, lastly, which did not promise to establish by its results, that the coöperation of the government was designed solely for the advantage of the country at large, and not to promote the individual benefit of the company."

Thus the government came in simply in aid of a private speculation so far as to supply the means of a better kind of instruction, at a less cost to students who should enter the school of agriculture. The aid came in to enlarge the benefits of the institution, and to increase the means of diffusing agricultural knowledge.

The wisdom of the early interference and aid of the government is sufficiently attested by the subsequent history of the establishment. Carried on with the idea and expectation of profit, no expensive experiments could be undertaken, of course, and after the school had been some ten years in operation, the director excused himself, to a gentleman who called, for not making experiments, by saying that the school was supported by stockholders with whom it was an indispensable condition, that the farm should pay a profit; saying, at the same time, that the German schools like Hohenheim, being supported by government, ought to be expected to make researches calculated to throw light on the principles of agriculture.

The lands were poor and much run out, though various in natural quality. Now the lands are worth six times as much as they were when the enterprise began, while some hundreds of young agriculturists have gone forth, competent for advice and execution, to apply the principles of the improved culture in various parts of the world.

In 1848, the government took the instruction under its charge, reduced the number of professors from eight to six, transformed the royal institute into a regional school, and on the 7th of December, 1852, this school received the title of Imperial School of Agriculture. The management of the estate remained in the hands of the society, a sort of board of trustees, which bears the title of Agricultural Society of Grignon. The director is nominated by the council of the society and confirmed by the Minister of Agriculture.

The capital employed amounts to $80 an acre of the cultivated land, and includes the stock, fixtures, forage, grain, &c., that is, the whole working outfit of the farm. This capital pays on the average about 10 per cent.; a part of it goes to the share-holders, a part to the increase of implements, and a part to the establishment of a reserve or sinking fund, which is already about $16,000.

As to the farm, it was not necessary, to show the merits of improved culture and the benefit it can render to the country, to select lands already rich and productive. M. Bella refused other places which were offered, and chose Grignon, which was noted for its undesirable condition and the poverty of its soil. Many things were in its favor, however. The extent of the domain, the importance of the buildings, a large park walled in, a sufficient distance from cities, a very favorable climate, a soil so situated as to correspond to conditions farther south than even many places in the south of France itself, the neighborhood of the great markets of Poissy and Saint Germain, and of the celebrated flocks of Rambouillet, Videville and of Douarière, and that of Paris, with its great scientific and industrial establishments, its museum of natural history, its conservatory of arts and trades, while several great and practically model farms, which offered an opportunity for valuable practical instruction to the pupils were near by, and pointed to Grignon as the place to found a great agricultural institute.

The domain is situated about twenty or twenty-five miles west of Paris, and sixteen or eighteen north of Rambouillet, and consists of about 1,170 acres, of which 600 are arable, 70 or so in natural pasture, 10 in garden, 6 under water, 70 occupied by buildings, roads and gardens, and the balance woodland.

These lands are partly on a plateau, nearly 400 feet above the level of the sea, and partly in a valley rather abrupt, at the bottom of which runs a stream which rises at Versailles, about ten miles off. This valley embraces the park of Grignon, of about 750 acres in extent, enclosed. They formerly belonged to the immense estates of noble families, till divided at the revolution of 1793, when this part, the estate of Grignon, passed into the hands of the father-in-law of Marshal Ney, who was married there. It was bought by Napoleon I. and given to Marshal Bessières. Napoleon used to come there to hunt foxes.

The widow of Bessières sold it to Charles X. The Duchess d'Angoulême visited it in company with the Duke of Bordeaux, and afterwards the Duke of Orleans and the Duke de Nemours paid their respects there.

The soil near the brook in the valley is, in part, a rich alluvial deposited by the stream. This rests on a white chalk, colored with black silex, which constitutes the bottom of the valley. Plastic clay occurs a little higher up. Coarse limestone rises above this clay, and contains marl very rich in shells, perfectly preserved. Six hundred varieties are found in it. This land is very rocky. The calcareous parts of the soil are wanting in depth, and become extremely dry and hard in summer. They are valued in the neighborhood at from sixteen to forty dollars an acre. The climate is good. It is seventy-five or eighty miles from the sea. Peaches, trailed up in espalier fashion on the garden wall, were in full bearing when I was there.

The buildings are arranged in a manner little adapted to the objects of the institute. They are 1,200 feet from the lowest part of the valley, and separated from most of the farm by steep slopes, which adds so much to the labor account, that Thaer said he would never have consented to undertake to cultivate in such conditions. The chateau is of very simple and solid architecture, built of stone and brick, in the style of Louis XIII., the time when it was constructed. It forms an open square to the north, at the angles of which there are four pavilions. The principal body, towards the south-west, comprises, on the ground floor, the vestibules, the chapel, the eating saloons and the collections. On the second and third stories are the dormitories. The south pavilion contains the kitchen below ground, the offices of the agricultural society at the entrance, and those of the school and of the director on the second floor. The body of the wing and pavilion is appropriated to the director and his family.

The west pavilion and west wing include the halls and recitation rooms, the north pavilion the apartments of the assistant-director. There are open courts on the two sides, at the south-west of the chateau. The farm buildings, since they have been occupied by the society, have become quite insufficient, and many additions have been required in the shape of granaries, pig-sties, sheep-folds, and a starch manufactory, which at least double the former capacity of the farm. The new buildings are simple and well-adapted to the end in view.

The stable is placed in the left hand side of the yard, the same as that occupied by the former residents of the chateau. It contains twenty, mares or gelded horses. The mare has been preferred on account of her quiet docility and lower price, and also because some attention is paid to breeding. Most of them are Percherons, and crosses with Percherons and Normans, and Bretons. Two are Suffolks, and two crosses of Cleveland Bays and Suffolks. The ox-stalls have ten head of the Swiss and Durham, Swiss and Limousin crosses. The stables for the dairy are placed at the north side of the two farm ways. They hold about a hundred head, of Normans and Swiss and some Shorthorn and Norman crosses, some Ayrshires, and some of the little Bretons.

A long experience has shown that at Grignon, the Swiss, which are the heaviest, are kept more easily than other races, even when obliged to keep them on poor and insufficient pastures, and that they are most profitable, that is, they give a greater yield of milk in proportion to food and live weight. The average yield of milk varies, generally, from six and a half to eight quarts per head per day for the year. Milk is the chief object of the dairy, because the production of milk gives a larger profit from an acre of forage than beef; but they try to combine the production of milk with a fat carcase, without feeding so high, however, as to lay on tallow. The bulls are worked daily. The herd is fed in the stable, as far as possible, but driven out for exercise each day, especially the young cattle. A herdsman has charge of from eighteen to twenty-two, feeding and milking them.

A piggery has been built by the society. It keeps from forty to forty-five sows, and four or five boars. They consist, mostly, of the English Berkshires and Hampshires, which have been bred at Grignon from the start. They are held in high estimation and much sought after, both for breeding and fattening. They have got up a white breed, which is a little more fine and delicate. The Grignon breed is very hardy and prolific, the average of pigs very rarely falling below sixteen for each female in a year. That is the general average of the sties. It is easily fed and fattened. They easily obtain 270 pounds of pork, at eight months, and 450 at a year old. Young choice pigs are readily sold at $6 apiece, at four weeks old, and ordinary ones at $3, for fattening.

The sheep-fold was built for the purpose, and is capable of keeping 1,200 sheep and their food. The larger part of the flock is composed of a cross of Leicester-Merinos, in the proportion of three-quarters Merinos and one-quarter Leicester. This cross is now fixed at Grignon, and gives excellent results. The sheep are generally fattened at two years, and give, at this age, from forty-five to sixty pounds of mutton. The wool is long and can be carded, and is sold from two to two and a half francs the killogramme (of two and a quarter pounds.) The average weight of the fleece is about nine pounds, in the grease. They have also a small flock of South Downs, which is very much esteemed for the quality of its mutton and its easy keeping qualities. A shepherd has charge of from two to three hundred head.

They also keep some fowls and raise silk-worms, commencing in June and ending in July, but only enough to serve the purposes of instruction.

A part of the yard which separates the cow stalls from the hay and forage barn, is devoted to making manure, in platforms on which it is worked over. The attention of visitors is especially called to the process of making manure, a thing too often neglected in France; and yet the great and single problem to solve, in agricultural industry, is the economical manufacture of manure. Quantity, quality and cheap fertilizing materials, are the source of great profit and prosperity in farming.

The choice of cropping and the low price of forage, the rations, &c., modify the price of the yield and the quantity of manure produced; the process of manufacture acting directly on the quality, it will be useful to indicate, in detail, the care devoted to this preparation.

One man has special charge of this work. The manure platforms are sixty feet long and eighteen feet wide, and are carefully macadamized and made slightly convex towards the outer borders. A trench surrounds them and serves to conduct the liquids, which empty into a kind of manure cistern, placed between the two heaps.

Every morning the manure of the horses, oxen and cows, is carried from the stables and wheeled, in wheelbarrows, upon the platforms; there it is spread in layers regularly with the fork.

The sheep manure is carried out of the pens every three weeks, in winter, and every six weeks in summer. This warm manure is carefully spread in alternate layers with that from the pig-sties. The heaps are raised to a height of nine feet. The upper part is covered with a layer of earth to prevent evaporation, and to concentrate the gas generated by fermentation. The heaps are watered with the liquid accumulated in the trenches or cisterns, whenever it is necessary.

When the manure has come to its normal condition, the volume of the heaps has been reduced about one-third, and the cubic yard weighs about 1,690 pounds. There are 260 cubic yards to the heap. The number of these heaps made yearly is twelve to fifteen.

When the time has come to carry out the manure into the fields, the precaution is taken to cut it down with a manure knife in slices perpendicular to the platforms, in such a manner that the upper layers are mixed with the lower layers upon the cart. By this very simple mode the manure is equal and uniform upon the whole field. I examined this process with care, and its economy, where the labor is at command, appears to be proved by experience. The same mode could be adopted in many of our barn cellars, where much of the labor of wheeling would be saved.

There is also an implement manufactory established as an aid in the courses of engineering and rural construction. It furnishes the students the tools which they have learned here to use, while many farmers rely upon the Grignon manufactory for the tools in general farm cultivation. They say they have orders from the centre of France, from Portugal, Spain, Algeria and America, though I do not think we have occasion to order largely. At the World's Fair of 1855–6 the Grignon plough was the lightest of all, and took the great gold medal.

The tools made there, and used on the farm, are ploughs, and the gang ploughs, double and triple, are in high repute, harrows, cultivators, horse-hoes and scarifiers, rollers, seed-sowers, root-cutters, liquid manure pumps, carts, &c.

To the west of the chateau is a little building designed to furnish the pupils the means of cultivating a field of exercise and study. This building includes a stable and six head of cattle, a little barn, a collection of implements, another of cultivated plants, a granary and slaughter-house. On this place the students manage as they wish, going through all the operations incident to a large estate. Close by is a shed for making drainage tile, and a beet-root distillery, a starch manufactory, &c.

Depth of ploughing on the one hand and the abundance of the manures applied, as well as the character of the croppings and the rotation, distinguish the cultivation of Grignon over that of the general farming of France. They plough up the stubble as soon as possible after harvesting. This ploughing is designed for the destruction of weeds. The work is done with the double or triple plough, which is considered best for this purpose. The second ploughing is done with the ordinary plough, and when it is designed to sow colza or roots, another horse subsoil plough follows the third ploughing.

As they make about 6,750,000 pounds of manure a year, they use nearly 70,000 pounds per acre. This manure is half decomposed and buried to the depth of the ploughing to compel plants to push their long roots down towards the subsoil.

The domain is divided into nine courses, one of which is in natural meadow; that is, cultivated with the natural or true grasses; two for artificial meadows, lucerne, sainfoin and clover; one for annual forage, vetches, pease, Indian corn, &c.; and one for roots, the products of which are all consumed by the cattle. So that five-ninths of the area are designed to keep up the fertility of the soil, while four-ninths only are reserved for exhausting plants, the cereals and colza. Adding to this the fields lying along the brook, we see that the course of cropping adopted is decidedly ameliorating. They feed 900 pounds live weight of cattle per acre, on an average. Nor is the rotation adopted less calculated to improve the soil than the course of cropping, because it places the artificial meadows—clover, lucerne, &c.,—in the most favorable conditions, close to the root crops, which are abundantly manured, and it alternates carefully the cereals with hoed crops which clean the land and prevent its exhaustion. The manuring is not wholly used up when another is added, as will be seen in this course.

1. Roots, strongly manured.
2. Cereals, mostly spring grains.
3. Clover.
4. Wheat.
5. Annual forage, for soiling cattle, half-manured.
6. Colza.
7. Wheat.

There is, sometimes, a deviation from this rotation, lucerne sown instead of clover. Oats follow the old lucerne, and spring and autumn wheat follows roots. This rotation divides the labor over the season advantageously.

The potato once stood at the head of the rotation at Grignon. It contributed much to improve the calcareous soils newly turned up. They cultivated first a late yellow variety, which produced on an average from 330 to 350 bushels per acre. Since the appearance of the disease, they cultivate an early yellow variety, which does not yield more than from 160 to 275 bushels.

The beets, first cultivated for the immediate consumption of stock, had the best part of the rotation of roots. It was a variety of the Silesian, with the long neck, yielding largely. After that the yellow globe was preferred. But since the lands have been improved and the distillery was built the roots go first to the distillery and then to the stock, so that the sugar beet is cultivated. The *Rose of Flanders*, and white Magdeburg, comprise the greater part of the roots cultivated. They are sown with the Grignon seed-sower. The yield varies from 36,000 to 74,000 pounds per acre.

The carrot is the most expensive root cultivated, and yet it is the most profitable on account of its great yield. Carrots are grown for horses and to vary the root fodder of horned cattle and lambs. The varieties are the white, with the green neck and the long red. The average product per acre, 40,000 to to 60,000 pounds.

The artichoke served as a transition crop to improve poor, calcareous soils, which it occupied for several years without receiving any manure. It has been since cultivated in the same conditions as other roots. It yields from 22,500 to 31,500 pounds of roots, on an average, per acre, and 2,700 pounds of stalks which, when cut, are mixed with the residue of the distillery and fed to cattle.

Wheat, sown in spring after roots, manured and on a single ploughing, has regularly given results which compare well with winter wheat, not only in point of quantity yielded, but in weight and quality. The general yield is from twenty-seven to thirty-eight bushels per acre. Mixture of wheat is common there, and succeeds well.

The oat cultivated there is brown and small. It yields well. It is the Houdan oat. Average product from thirty-three to sixty-six bushels per acre.

The variety of barley is the two-rowed. Its average yield is from thirty-three to forty-five bushels per acre.

Clover would not succeed well at first, at Grignon, and was not cultivated. Now it yields excellent crops, amounting to from 2,700 to 4,500 pounds per acre.

The high cost of vetches for seed and the advantages of Indian corn for green fodder have led to the extensive culture of the latter, but they cultivate all the kinds of green fodder from the earliest to the latest. Grignon first introduced the *Moha de Hongrie*, or Hungarian millet, which has succeeded admirably.

Colza, after having been cultivated by sowing in rows, is now always transplanted.

Sainfoin formerly was cultivated alone but is now mixed with lucerne and clover, in order to render the meadows more suitable for pasturing sheep. Lucerne is sown at the rate of twenty-two pounds per acre. The variety which has given the best result is that of Provence. It yields from 2,700 to 5,400 pounds per acre. The farm cuts not far from about 300 tons of hay, including the lucerne and clover. About forty-eight acres are in natural meadows, that is, in Timothy, redtop and similar grasses.

It is a precept of the school at Grignon that the land is a machine which it is best to improve, whenever it is in favorable economical relations, in order to make it work as well as possible. The improvements accordingly commenced on the poorest, or, at least, the most exhausted lands, and they have been pretty complete.

Though the imperial school was detached from the charge of the agricultural society the *personnel* of instruction and the relations of the students, with the body carrying on the farm, have not changed. The society and direction furnish, as formerly, all the means of study and investigation that can be desired. The school and the farm are under the same director.

The pupils are required to work four hours a day, and are successively charged with different service on the farm, which they are called upon to observe daily. They assist from four and a half in the morning, in the order of work which the director gives to the different chiefs, and in the evening they assist in the daily reports which are given in to the director, and in entering upon the books the reports upon all the operations of the farm. The labors which they perform are various. They comprise the cultivation, the care of animals, the manufactories, the permanent improvements, building of roads, the care of the forest, the gardens, &c. They attend, during the visits of the veterinary surgeon, in the cattle stalls; they curry the cattle and horses, and perform various operations under the directions of the heads of the various branches. Each pupil is obliged to make a detailed report to the director upon the work he performs, and is allowed to make any suggestions he may see fit, which are accepted and acted on when practicable.

This constitutes the practical part of their education. Two are appointed as general inspectors under the orders of the director, and the duties alternate; that is, a certain number has charge of one department for a certain length of time, say a week or a month, and then they are assigned to another department in succession; as, for instance, four may be charged with the management of the oxen; two with that of the horses; two with the pigs; two with the sheep; two with the poultry; four with the silk-worm establishment; forming thus a sort of committee on each branch, the duty of which is to see that proper attention is paid to all the details, as among stock, to see that it is properly fed, to note the results of any changes of feed, &c. So, too, with the garden; two or more are appointed; two on woods and plantations; two to inspect the repairs and improvements going on; two on the manufacture of starch, cheese and other manufactured products; two on book-keeping and accounts, &c.

I believe the practice is to have one of the two on each committee of two years standing and the other a newly-entered pupil. At the end of the week all are required to make a report in the presence of the whole school, when the professor comments or enlarges upon the various operations going on, and gives such additional information as may be suggested by the facts presented. In addition to this exercise, which has the effect to train the young men in the art of composition and the skilful use of language, as well as to keep them informed of the working of the whole system, the professor takes the classes to see the various operations on the farm, pointing out the most approved method of performing them, &c. He lectures thus on the different practical processes of farming at the seasons when they actually take place.

Each professor, in his own department, moreover, is expected to give his instruction a practical turn, by means of short excursions, botanical, geological, &c.

It is thus they are initiated into the daily routine of the farm, and become the active agents of this great rival administration. Whenever an interesting experiment is proposed by a student, the director puts the machinery, animals, &c., at the disposal of the professors or tutors, and the pupils are designated to make the investigations.

The school takes only inside pupils; that is, they must all live on the place. No one is admitted except on a preparatory examination at the chief place of his department, and final trials also take place at the school. The candidate must be seventeen years old, and be a Frenchman or a naturalized citizen. Whoever desires to enter must address his application to the Minister of Agriculture, on or before the 25th September of each year, with certificates—

1st. Of the place and date of birth.

2d. Certificate of the mayor of his residence, to the effect that he is of good life and morals.

3d. Of a physician, that he has been vaccinated, and has had the petit varioloid.

4th. An obligation, on stamped paper, by the parents, tutor, or guardian of the candidate, to guarantee the payment, a term in advance, of his board during his sojourn at the school.

After passing the examination at home and having got the authority of the Minister of Agriculture, they repair to Grignon on the morning of the 1st of October, present themselves to the director, who gives each a number in the order in which they will be examined. This examination embraces the following:—

In arithmetic, the four rules, fractions, extraction of square and cubic roots, proportions and progressions, and the rule of three.

In geometry, propositions relative to straight lines, angles, circles, measuring of lines and plane surfaces, equivalent to the first four books of Legendre. In physics, the general properties of bodies, the thermometer and the barometer.

A composition in French is also required, to show the orthography and grammar of the applicant. When the trial is ended, the admission is declared according to the order of merit. The number of new pupils is limited. When admitted, they enter immediately upon the duties assigned them.

The duration of the studies is three years, after which the capable and meritorious students receive a certificate. The best students, on going out, can have positions for two years in some of the agricultural establishments of the government.

The school year begins the first of October, and is divided into two terms. At the end of each there is an examination by a committee. The first term is five months, and the general examinations at the end of the first term take place from the 1st to the 15th of March. Then the second term begins, and comprises the last half of March, the intervening months till August, when the vacation begins.

The instruction is theoretical and applied. The first comprises—

1. A course of physics, chemistry, mineralogy and geology, applied to agriculture.
2. Rural engineering.
3. Cultivation.
4. Zootechny and agricultural zoölogy.
5. Sylvæculture and botany.
6. Economy and rural legislation.
7. Practical notions of farm accounts.

The practical instruction is manual and rational. It comprises the use and management of farm tools, implements, carriages, machines; the organization and execution of the principal operations of agriculture, ploughing, sowing, seeding, harvesting, treatment of root crops, care of farm stock of every kind, exercises in linear drawing, surveying, laying out plans, levelling, getting the cubic contents of solids, some of the manipulations of the laboratory, analysis of soils, application of manures, &c. Agricultural excursions are made, as well as botanical, geological, and forest. Instruction is given by observation in the horse and cattle stables, and by demonstrations on the field. In each speciality of theoretical and practical instruction, the professor is aided by a tutor. All these courses, examinations, &c., are expressly obligatory on every pupil.

There is a chaplain and a physician attached to the school.

The price of board, &c., is $150 a year. It includes food, lodging and bed, medical attendance, warming, lighting, and washing.

Prizes are distributed among the most deserving pupils.

There are three of these imperial schools of agriculture in France, but Grignon is the largest, as well as the oldest and best, though the regulations, terms of admission, course of instruction, &c., are the same in all.

The number of pupils at Grignon is usually seventy-five.

### CIRENCESTER.

The agricultural college of Cirencester, in England, is situated in Gloucestershire, about ninety-five miles from London. It was incorporated on the 27th March, 1845, for the purpose of affording a practical and scientific agricultural education to students from all parts of the kingdom.

I visited it in June, taking letters of introduction to Prof. Voelcker, who has, for some years, held the chair of agricultural chemistry; but who, like most of the other professors, had resigned, and was about removing with his family into London. Owing, partly no doubt, to the peculiar mode of management, this institution does not appear to have commended itself very strongly to the confidence and good-will of the people, and hence it has proved to be a partial, not to say a complete failure. It has now a debt of £30,000 or $150,000, which is a source of great embarrassment, in addition to the various other causes of ill success, which need not be stated in detail here.

When I was in London, in 1862, all the professors resigned their positions, and most of them, I believe, left; one or two, only, having been persuaded to hold on, to save the institution from utter ruin. It only adds another to the list of instances, which might be given, to show that success or failure will depend very much upon the man at the head, however great may be the incidental advantages which may concur in favor of such an enterprise.

A mistake appears to have been made at the outset, by fixing the charges too low. It was designed to meet the wants of those young men, sons of farmers, who wished to prepare themselves for stewards or bailiffs; and who could ill afford to pay even the £30, which was the amount fixed, including board and tuition. Small farmers could not send their sons, and rich ones would not. But if an ungovernable lad had been rejected or dismissed from other schools, he was pretty sure to turn up here, and the consequence was the college got a large proportion of all the naughty boys in the kingdom.

The enterprise was started, at first, as a joint-stock company, the stock being taken up by subscription ; and the concern was governed, or rather, there was an effort made to govern it, by a full board of the subscribers. Such an arrangement, as might have been anticipated, worked badly; and after running a hundred and twenty-five thousand dollars in debt, with no means of paying, a few noblemen came forward to assume the debt and the management. They raised the charges and attempted to put the establishment on a different basis.

They do not appear to have remedied the difficulties to any great extent; though the institution still lives, with about sixty students, now consisting of the sons of the rich. I am indebted to various individuals for many facts in regard to the college, in addition to my own observations on the spot, and I draw, also, from the printed programme that was placed in my hands.

*Objects.*—The chief object of this institution is to afford such a course of education, as will be most useful to those whose destined profession is to connect them with agriculture, at home or in the colonies, whether as owners or occupiers of land, land agents or stewards.

*The College Buildings.*—The college, which adjoins the park and woods of Earl Bathurst, is situated on the farm, about a mile and a half from the town. The principal front, 190 feet long, has a south aspect, and commands an extensive view over North Wiltshire. The buildings include a chapel, large dining hall, library, museums, lecture rooms, laboratories, class rooms, private studies, kitchens and servants' offices; with apartments for resident professors, and ranges of dormitories on the upper floors. The whole building is lighted with gas, and furnished with ample supplies of water. The best methods of warming and ventilation have been adopted. Each student has a separate sleeping apartment, and private studies are allotted to the meritorious students, as they become vacant.

*The Farm.*—The farm, which surrounds the college, contains about 500 acres, of which 450 are arable, of a varied soil and character. The farm buildings are spacious, and well adapted for carrying out the purposes for which the college was founded. A steam engine, with improved mechanical arrangements, furnishes all the power for threshing, grinding, &c.

Live stock, of various kinds, are bred and reared on the farm. Experiments are tried on portions of the various rotations; and where the results are satisfactory, they are carried out on a larger scale. A botanical garden, of ample extent, enables the professor, under whose charge it is, to instruct practically in the botany of agriculture; and to show to the students various experiments in vegetable physiology.

*The Veterinary Hospital*, is under the immediate superintendence of the professor of the department, assisted by a curator selected from among the more advanced students. Animals of all kinds are received for treatment, so that the students have opportunities of witnessing operations and *post mortem* examinations.

*Museums.*—The college possesses a valuable collection of geological specimens, minerals and other objects of natural history; also an interesting set of anatomical and pathological preparations—such as casts of teeth, to illustrate the age of the horse, sheep and other animals; and is now provided, by the gift of Messrs. Peter Lawson & Son, of Edinburgh, with the extensive museum of economic botany, prepared by those gentlemen for the international exhibition of 1862. This collection contains specimen plants of nearly all the varieties of known cereals, samples of seed of every species of plants used by the agriculturist, and also a series of wax models of every variety of cultivated roots.

*Management.*—The management of the whole establishment of the college is committed to the principal, who is responsible to the council for every thing, and superintends and controls every department of the college. He attends to the religious instruction and moral discipline of every in-student, and exercises such supervision over the conduct and pursuits of the out-students, as the nature of their relations with the college will permit.

*Agriculture.*—The instruction in agriculture, consisting of lectures and practical classes on the farm, is given by the professor of practical agriculture, who is also the farm manager, residing on the farm, where students have every opportunity of becoming acquainted with and taking part in the manual operations of husbandry. They thus acquire a practical knowledge of the management of labor; of the uses of the different implements; of the application of steam machinery to farming purposes; of the breeding, rearing, feeding and general management of all kinds of stock; and of the rotation of crops, and their fitness, more or less, for different soils.

Each student is expected to keep a daily journal of all the operations on the farm, and to make himself thoroughly acquainted with the accounts.

*Chemistry and Chemical Manipulation.*—A well-appointed laboratory is devoted to instruction in chemical manipulation and analysis, which are taught to each class of students in succession, under the superintendence of the professor of chemistry and his assistant.

The students, after studying the properties of the more commonly occurring substances, are made to analyze a series of compounds, proceeding from simple to more complex cases; after which they apply the knowledge, thus obtained, to the analysis of manures, soils, ashes of plants, farm products and other substances more immediately useful to the practical agriculturist.

Analysis of artificial manures, oil-cakes, waters, &c., for members of the Royal Agricultural Society, and others, are daily performed in the college laboratory, and chemico-agricultural researches undertaken by the more advanced students, under the immediate direction of Dr. A. Voelcker and assistants.

*Geology.*—Besides the lectures delivered on geology, the students are instructed by accompanying the professor of geology in field excursions and geological surveys in the surrounding neighborhood.

*Entomology.*—Lectures on entomology are delivered weekly, and students are encouraged to make collections of insects.

*Botany.*—A complete set of lectures on systematic botany, illustrated by a botanical garden, is annually delivered; and the professor of botany conducts botanical excursions weekly, during the summer and autumn months.

*Veterinary Medicine and Surgery.*—Instruction in this department includes a complete system of anatomy and pathology. Pupils are required to note all hospital cases in their journals.

*Surveying and Civil Engineering.*—In this department is embraced instruction in those mathematical subjects, which are connected with surveying, engineering, &c.; regular and frequent opportunities being afforded for practical instruction in the field in surveying, levelling and land measuring, and in the use of the theodolite, spirit level and other instruments.

*Architectural and Mechanical Drawing.*—A certified master, from the science and art department of the committee of council on education, South Kensington, teaches these subjects.

*Admission.*—The principal will furnish the necessary forms for the admission of in-students, who are required to be sixteen years of age.

Out-students are admitted to attend the lectures and avail themselves of the practical instruction of the institution. During their pupilage they are amenable to the college regulations, under the penalty of forfeiting their fees; which are also liable to be forfeited, in the event of any serious misconduct being brought under the notice of the public authorities. Except in certain cases, out-students are required to be one-and-twenty years of age.

*Vacations.*—There are two vacations in the year, each extending over seven weeks; the commencement of the summer one being about the 18th of June, and of the winter one, the 18th of December.

*Charges.*—Per annum, to be paid half-yearly in advance, in-students, £90; out-students, £42.

There are a few private rooms in the college, appropriated to the students' use, for which there is an extra charge of £21.

These terms include every thing, except medical attendance and books.

A quarter's notice of the intention to remove any student, must be given by the parent or guardian to the principal, or a quarter's fee will be incurred. Students residing, or having their names on the books for any part of a quarter, will be charged the fee for the whole quarter. The college quarter days are January 6, April 6, July 6, October 6.

The college diploma or certificate—which admits those holding it to the position of graduate, under the title of member—is granted only to those who, at their final examination, show that they are thoroughly masters of the subjects of the various lectures, and are, besides, well acquainted with practical agriculture. Nor is this, or any other certificate, granted to students whose conduct has not given entire satisfaction to the authorities. The names of the members appear in the prospectus.

Copies of a set of examination questions, on the subjects of one session or half year, are also annexed. As these questions are all taken from the lectures and practical instruction previously attended by the students examined, they are well calculated to show what is taught at the college.

A scholarship of the value of £40 per annum, and tenable during three sessions, is given to the first man in each session. Students who enter at the quarter are allowed to compete for this, but are required to obtain for success five per cent. more marks.

It happened to be vacation when I arrived, and therefore I had not the good fortune to see so much of the practical workings of the college, as I should have been glad to have seen; still I visited the collections, the lecture rooms, the laboratory and the farm, in company with Dr. Voelcker and Prof. Coleman, the manager of the farm, and saw the whole system adopted, as well as could be expected under the circumstances.

The farm appeared to be under a good state of cultivation. All the labor is hired, the regular farm wages being seven shillings a week, the laborers finding themselves. That is twenty-eight cents a day. Good ploughmen get as high as twelve shillings a week, and in harvest time three shillings a day.

They had about 500 sheep at the time I was there, but they usually winter about 700. They were mostly Cotswolds, and looking finely. The farm buildings are of stone, plain and substantial. The fattening animals are kept constantly in boxes, the best size of which, it is thought there, is 9 feet by 9, on account of their treading the manure better in small boxes. They consider the Yorkshire pigs the best and most profitable. Some of them were immensely fat, having been prepared for the Worcester exhibition of the Royal Agricultural Society.

The answer to the question why they got them so fat for that purpose, was that others do, and they are obliged to conform to the practice or fail, though the manager appeared to disapprove of the practice.

Among the crops were many acres of horse beans. The yield is 40 bushels per acre, 56 lbs. to the bushel, and one ton of straw. They are sown at the rate of 3 bushels per acre, in drills 17 inches apart. They grind them up, and give them to horses, sheep, &c. The wheat was at its full growth, and looking very well. The farm horses are Clydesdales. They are large and very useful animals, easily kept in condition. I should think they would weigh from 1,200 to 1,400 lbs. There are various facilities for work, such as a steam-engine, which does a great many kinds of work, like threshing, grinding, winnowing, &c. There is also a blacksmith shop on the place.

Experiments were being carried on upon the wheat fields upon a pretty large scale. They are of considerable interest and importance, but an enumeration of them would lead too far.

The following questions at the final examination for the diploma, will indicate the nature of this trial, and at the same time the course of instruction which had been pursued:—

### Practical Agriculture.—*First Paper.*

1. Enumerate the crops at present growing on the Royal Agricultural College Farm, naming that which each field bears, or is being prepared for, and the acreage in each crop, as nearly as you can recollect.

2. Describe the acts of husbandry during the present session, in lots Nos. 11, 19, and (3 and 5,) and the objects kept in view in each.

3. Describe and value the acts of husbandry during the present session in lot No. 8, and their object. State generally the best methods of cleaning (1) strong clays, (2) moderately light soils.

4. Describe (very briefly) the principal implements employed on the Royal Agricultural College Farm, and give a catalogue of those which would usually be required on a farm of 400 acres of turnip land.

5. Give an account of the different methods of planting potatoes according to the nature of the soil. Illustrate this from the plan adopted in 3 & 5; enumerate also the manures used for this crop in that field, and their apparent result up to this date.

6. What are the uses of the different kinds of root crops? What soils, what climates are best adapted to each sort respectively? Show how far one sort of root crop can replace another. What species of root will best take the place of an early spring green crop?

7. What is the best method of cultivating barley? How would you manage the previous crop, so as to insure a good seed bed? State the quantity of seed, and the soils best suited to this crop.

8. Write a short essay on parallel drainage, paying attention to—
   (1.) The nature of the soil for which the system is adopted.
   (2.) Depth and frequency of drains.
   (3.) Action of parallel drainage.
   (4.) General cost, and the return that may be expected from it.

### *Second Paper.*

1. Explain the principles and use of the liquid manure drill.

2. What is the use and object of a rotation of crops? Describe a three, four, and five-field course, and state to what description of soil each is respectively adapted. Give examples when you can from the college farm.

3. At what period (1) of the year, (2) of the rotation, would deep ploughing be advisable? What kinds of soil does it benefit, and when should it be avoided?

4. Explain the functions of live stock on a farm. What effect has turnip husbandry produced on the meat-eating population of this country?

5. State briefly a few particulars relating to the breed of short-horned cattle, mentioning any remarkable sales or favorite lines of descent of the breed.

6. Of what component parts does milk consist? Shew the use of each of them in the dairy.

7. Describe the general management of the fatting and breeding flock during the present session.

1. Explain the difference in posting a cash and a credit transaction, and show how the following transactions would appear in your Journal and Ledger:—

June 10, 1857, Sold Mr. Thos. White 28 qrs. Wheat at 50s.
Bought 10 qrs. Oats of Mr. Jones, at 26s. and paid for the same.
Received from the Gloucestershire Banking Company £123 5s.
Hired Thrashing Machine of Mr. Slatter, 3 days at 25s.

### *Inorganic Chemistry.*

1. Mention the preparation and properties of ammonia.

2. Describe the general properties of ammoniacal salts, and the mode of detecting adulterations in sulphate of ammonia.

3. Mention some manuring matters which owe their efficacy to the ammonia they contain.

4. How do you ascertain the presence of ammonia in a substance, and how do you determine it quantitatively?

5. Give a short definition of the following terms:—alkali, base, acid, salt, metal, metalloid, neutral, basic, mineral, organic, combination, mixture, soluble, volatile, and fix.

6. State in a general way the composition of mountain limestone, cornbrash, forest marble, and lias-lime and magnesian limestone, and their relative agricultural value.

7. How much oil of vitriol must be added to 1 ton of bone-ash in order to render all the phosphate of lime in it soluble?

Composition of commercial bone-ash:—

| | | |
|---|---|---|
| Moisture, . . . . | 6.05 | |
| Organic matter, . . | 1.03 | Equiv. of Ca=28 |
| Phosphate of lime, . | 75.84 | " " P =32 |
| Carbonate of lime, . | 7.04 | " " S =16 |
| Sand, . . . . . . . | 9.88 | |
| Alkaline Salts, . . . | .16 | |
| | 100.00 | |

8. How do you detect the presence of alum in bread?

9. Describe the preparation and properties of alumina.

10. A liquid contains soluble phosphate of lime, gypsum, and sulphate of ammonia; how can you recognize these compounds?

### *Organic Chemistry.*

1. Explain the following terms:—decay, fermentation, and putrefaction.

2. In what respects do organic acids differ from mineral acids, alkaloids from alkalies?

3. Mention the proximate and ultimate constituents of wheat, potatoes, turnips, clover, pease, and cabbage.

4. State the composition of woody fibre, gun-cotton, starch, milk-sugar, lactic acid, and cane-sugar.

5. What are the changes which organic matters, containing nitrogen, undergo during putrefaction?

6. What is the chemical constitution of fatty matters?

7. Describe the preparation and properties of urea.

8. Mention the adulterations which are sometimes found in milk, and the mode of detecting them.

9. Write a paper on the chemistry of brewing.

### *Agricultural Chemistry.*

1. What are the sources from which plants derive their nitrogen and carbon?

2. When is it desirable to preserve as much as possible the organic matter in soils, and when may it be destroyed without injury to the land?

3. How do you ascertain the commercial and how the practical value of manuring matters?

4. What is the composition of blood-manure?

5. Describe the preparation and properties of a good super-phosphate, and give reasons why it is more economical to buy this manure than to prepare it on the farm.

6. Write a paper on guano, stating the properties and composition of good Peruvian and of inferior guano, the adulterations in guano, the mode of detecting them, and the crops most benefited by guano.

7. What is the composition of liquid manure and its agricultural value?

8. Can sewage economically be converted into a portable manure? Give reasons.

### *Anatomy and Physiology.*

1. What general principle should regulate the breeder of stock in the selection of animals for that purpose?

2. What diseases are likely to be transmitted from parents to offspring?

Describe the general anatomy of the foot, remarking on the differences in the organ of ox, sheep, dog, and pig, as compared with the horse; concluding with a consideration of the principles of shoeing, as applicable to the colt as well as to the adult horse in active work.

### *Pathology.*

Write a description of the disease of diarrhœa occurring in horses, oxen, and sheep; including the subjects of causation; the elements of the disease, symptoms, stages, and results, with the principles on which the treatment should be founded; explaining the variations in practice in the several cases of the horse, ox, and sheep.

Describe the following diseases of the foot:—corn, quittor, foot-rot, foul, and canker; pointing out the causes, symptoms, and treatment; explaining the consequences of each affection, probable duration, and influence on the animal's soundness.

### *Geology.*

1. Give an account of the geology of phosphatic deposits, as they occur in the different stratified rocks of England.

2. Describe the English new red sandstone formation, having particular reference to the following points:

I. Its geological and geographical position.
II. Its subdivisions and their characters.
III. Its minerals and economic materials.
IV. Its fossil contents.
V. The importance of a correct knowledge of this rock in a coal diagnosis.

The spirit of *caste* so prevalent in England has probably been the cause of the failure of this college to meet the expectations of the friends of agriculture, or to commend itself to any considerable portion of the people. I could not learn that it was popular with any class. They are waiting for something to "turn up," but in the meantime an enormous debt hangs like an incubus upon the college. Its future is therefore doubtful.

## THE ALBERT MODEL FARM, GLASNEVIN.

The Albert National Agricultural Institution, near Dublin, was the first that I visited. I had landed at Queenstown, chiefly for the purpose of seeing something of the system adopted in these institutions in Ireland, and after visiting Cork and Kerry, which lie on the way, I lost no time in introducing myself to Dr. Kirkpatrick, the chief inspector of agricultural national schools in that country. His head-quarters are at the Albert model farm. Through his kindness I was very soon put in the way of whatever information I might need, both in regard to the practical working of the school at Glasnevin, and the farm on which it is located, and in regard to the system of agricultural instruction throughout the country.

Among other things placed in my hands, was a little hand-book of the model farm, by Thomas Baldwin, the lecturer on agriculture there, and from this I condense a good many of the following facts relating to the buildings, the farm, the crops, &c.:—

This institution was established in 1838 by the Board of National Education in Ireland, and is designed to supply such instruction in the science and practice of agriculture as will qualify young men for becoming farmers, land-stewards and teachers of agriculture.

The institution, which stands upon the farm, is about three statute miles from the city of Dublin, and but a short distance from the Royal Dublin Society's beautiful botanic gardens, which are in the immediate vicinity of the village of Glasnevin, which has a historic interest from the fact of its having been the residence of Addison, Delany, &c.

The building, which is massive, but without architectural beauty, comprises dormitories, dining and school rooms, library and laboratory, in addition to apartments for resident officers of the institution, and a considerable range of farm offices.

The ground attached to the Albert institution is appropriated as follows:—

| | A. | R. | P. |
|---|---|---|---|
| For farm purposes, . . . . | 169 | 1 | 2 |
| Gardens and pleasure grounds, . | 10 | 0 | 22 |
| | 179 | 1 | 24 |

Two classes of pupils attend this institution, viz.:—

1st. Externs, or non-resident pupils, who board and lodge at their own expense, within reasonable distance of the model farm, and who are admitted on the following terms: First, that each pays an entrance fee of two guineas; second, that they engage in the ordinary farm work; third, that they attend the lectures punctually; fourth, that they be amenable to all the rules and regulations of the institution.

2d. Interns, or young men who intend to become land-stewards or working farmers, and who are boarded, lodged and educated at the public expense for a period of two years.

In June, 1860, the commissioners decided that admission to this class shall, in future be obtained by competitive examination.

A candidate is expected to possess the following qualifications:—

1st. A certificate from a clergyman of his religious persuasion, testifying as to his moral character.

2d. A certificate from a medical man, testifying that he is of sound health.

3d. His age must not be under seventeen.

When the parents, guardian or patron of a lad decide on seeking permission for him to compete, they communicate with the secretaries of the Board, who, in reply, furnish a blank form, containing a number of queries and forms of certificate, all of which must be duly filled, and returned.

If the applicant is deemed eligible, he is entered on the list of candidates for the approaching examination, of the time and place of which due notice is given.

As it has been decided to admit pupils in the beginning of January and of June each year, the examinations take place in May and December.

In January, 1861, for example, thirty-four candidates were admitted by competitive examination. The mode of conducting the examinations was as follows:—

Seventy-four candidates having been found eligible for competition, were summoned to attend on a given day and hour at the residences of the inspectors of national schools in their respective districts.

The candidates were then subjected to a written and oral examination for a fixed time in the following subjects:—

*Reading.*—To read with correctness any passage selected in the Fourth Book of Lessons.

*Writing.*—To write a legible hand with facility.

*Spelling.*—To write from dictation, with correctness any passage selected from the Third Book of Lessons.

*Grammar.*—To know the parts of speech, and to possess such an elementary knowledge of syntax as to be able to parse short and easy sentences in prose.

*Geography.*—To be able to define the technical terms of geography, to know the general outlines of the map of the world, and the boundaries, counties, chief towns, rivers, &c., of Ireland.

*Arithmetic.*—To be able to repeat with accuracy, or write out the several arithmetical tables, and to work with facility and accuracy easy questions in the elementary rules, fractions, simple proportion and practice.

*Book-keeping.*—To be acquainted with the nature and use of a cash account.

*Geometry.*—To know at least the first book of Euclid.

The questions and the time allowed for answering them being the same in each case, the examination was as strictly competitive as if the boys were congregated in one room.

All the papers were transmitted to Dublin, and fifty of the best answerers summoned up to Glasnevin, and there subjected to a second and more searching examination in the subjects following:—

*Reading.*—As in number one.

*Writing.*—Ditto.

*Spelling.*—To write from dictation, with correctness, any passage selected from the Fourth Book of Lessons.

*Grammar.*—To have a fair knowledge of the text of Sullivan's Grammar, and to be able to parse easy sentences in prose from the Fourth Book of Lessons.

*Geography.*—As in number one, with the general geography of Europe.

*Arithmetic.*—Reduction, decimals, fractions, simple proportion and practice.

*Book-keeping.*—To be acquainted with sets I. to IV., in the Board's book-keeping.

*Geometry.*—As in number one.

*Agricultural Chemistry.*—Hodge's First Lessons in Agricultural Chemistry.

*Practical Agriculture.*—Introduction to Agricultural Class-Book, and chapters XI., XII., XIII., of Murphy's Agricultural Instructor.

The business of the institution and farm is conducted by the following staff:—

1. The superintendent, Dr. Kirkpatrick, (who has the entire management of the concern,) training and farming departments.
2. A matron.
3. An agriculturist, who has charge of the practical management of the farm.
4. A gardener, who conducts the horticultural department.
5. A literary teacher.

In addition to these, there is a staff of non-resident lecturers, viz.: on

1. Animal physiology and pathology, and the treatment of the diseases of the domestic amimals.
2. Botany and vegetable physiology, in their relation to agriculture.
3. Chemistry and geology, in their relation to agriculture.
4. Agriculture.
5. Horticulture.

Each of the officers gives two courses of lectures in the year, which is divided into two sessions; the first session begins after Christmas and ends in June, and the second ends at Christmas.

At the termination of each session, the lecturers hold examinations, and award premiums to the most deserving pupils, according to the following scale:—

| | | | £ | s. | d. | | | |
|---|---|---|---|---|---|---|---|---|
| 1st. Chemistry, | 2 | Prizes at | 1 | 10 | 0 | | | |
| Ditto, | 2 | " | 1 | 0 | 0— | 5 | 0 | 0 |
| 2d. Botany, | 2 | " | 1 | 10 | 0 | | | |
| Ditto, | 2 | " | 1 | 0 | 0— | 5 | 0 | 0 |
| 3d. Animal physiology and diseases of farm animals, | 2 | " | 1 | 10 | 0 | | | |
| Ditto, | 2 | " | 1 | 0 | 0— | 5 | 0 | 0 |
| 4th. Horticulture, | 2 | " | 1 | 10 | 0 | | | |
| Ditto, | 2 | " | 1 | 0 | 0— | 5 | 0 | 0 |
| 5th. Literary subjects, | 2 | " | 1 | 10 | 0 | | | |
| Ditto, | 2 | " | 1 | 0 | 0— | 5 | 0 | 0 |

| | | | £ | s. | d. | | | |
|---|---|---|---|---|---|---|---|---|
| 6th. Agriculture, | 1st Prize, | | 3 | 0 | 0 | | | |
| Ditto, | 2 Second Prizes, | at | 2 | 10 | 0 | | | |
| Ditto, | 3 Third " | at | 2 | 0 | 0 | | | |
| Ditto, | 4 Fourth " | at | 1 | 10 | 0 | | | |
| Ditto, | 5 Fifth " | at | 1 | 0 | 0 | —25 | 0 | 0 |
| | | | | | | £50 | 0 | 0 |

No pupil can take more than three prizes* in one session.

The course of instruction is said to be more comprehensive and complete than that afforded at any similar institution.

The literary masters teach English grammar, and composition, arithmetic, book-keeping, and mathematics, including land-surveying, levelling, and mapping.

The instruction in agriculture embraces all those branches which constitute the science of farming, as well as a detailed account of the enlightened and improved practices of the day; and in order that the pupils may become thoroughly acquainted with improved practical husbandry, they are called upon to take part in the performance of every farm operation, and the feeding and management of live stock. They have an opportunity, too, of practically studying the application of steam power to agricultural purposes, as well as the use of a large assortment of those modern implements and machines, which are found economical substitutes for manual labor.

The Farms and Gardens.—The soil is a clay loam of a brownish color, resting on the calcareous formation; its maximum elevation is 172 feet, minimum, 148 feet; and the greater portion of it has a slight inclination to the south. The depth of the surface soil averages from eight to twelve inches.

Dr. Hodges' examination of the soil and subsoil gives the following results:—

| | Soil. | Subsoil. |
|---|---|---|
| On mechanical examination every 100 parts contained clay and finely divided matter, | 24.71 | 28.32 |
| Sand and small stones, | 75.29 | 71.68† |
| | 100.00 | 100.00 |

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* A silver medal is awarded, each session, to the most talented and deserving pupil.

† Consisting of coarse granules of blackish limestone, gray chert, and calcareous sand.

Every 1,000 parts of surface soil retained 688 parts; of subsoil, 484 parts of water.

Of the water which the specimens had imbibed, in four hours the surface soil lost by evaporation 17.8; the subsoil 30.6 per cent.

I. *The Large Farm*, 145A. 3R. 37P., is divided into four sections, on each of which a distinct course of farming is pursued, as follows:—

| | | Area. |
|---|---|---|
| *a* Three Course Rotation, about | | 21 |
| *á* Four " " " | | 36 |
| *b* Five " " " | | 25 |
| *c* New Farm, Wheat, | 14 | 51 |
| " Pasturage, | 37 | |

Yards and Offices, Paddock, &c., occupy the remainder.

The order of succession of the crops in the three course rotation is:—

1st year, Green crops, manured.

2d year, Grain, with Italian rye-grass, and clover.

3d year, Grass, for soiling and hay.

In the fourth course, usually called the "Norfolk Shift," the crops succeed in this order:—

1st year, Green crops, manured.

2d year, Grain, with grass seeds, generally Italian rye-grass.

3d year, Grass, for house-feeding cattle, and hay.

4th year, Oats.

The five course on this farm differs from the last in keeping the grass field unbroken a second year. The crops, therefore, succeed in this order:—

1st year, Green crops, manured.

2d year, Grain, with grass seeds.

3d year, Grass.

4th year, Grass.

5th year, Oats.

The balance-sheet has been satisfactory, showing a credit of from two hundred to three hundred pounds a year in favor of the pupils' labor.

II. *The Small Farm*, 23A. 1R. 5P., was established in 1856, for the purpose of affording an illustration of small farm management, and to present to the sons of small farmers an example which they may imitate.

The following five course rotation is carried out on this farm:—

1st. Turnips, Mangel Wurzel, and Carrots.
2d. Potatoes, Winter Beans, and Cabbages.
3d. Italian rye-grass.
4th. " "
5th. Oats.

The Italian rye-grass is sown in autumn, immediately after the harvesting of the potatoes and beans, and a most luxuriant crop is thus obtained. This season they had grass three feet long, and yielding ten tons per statute acre on this farm early in May. Italian rye-grass has been sown on the Albert Farm in autumn, after grain; but though every care has been taken to have the ground properly prepared by the use of Bentall's broad-share, grubbing, &c., yet the following crop of grass has not been quite satisfactory.

Some are not favorable to two years' growth of Italian rye-grass unless where there is an unlimited command of liquid manure or frequent top dressings of the artificial manures. This grass is a gross feeder; and when it grows luxuriantly the first year, it degenerates in the second, not so much from the habits of the grass itself as from want of nutriment in the soil.

As might be expected, the pecuniary results of the working of this farm are more favorable than those of the larger one. There is a balance of £70 11s. 5½d. after allowing the sum of £42 7s. 8d. (at the rate of £2 5s. per statute acre,) for the pupils' labor.

III. THE HORTICULTURAL DEPARTMENT consists of a kitchen and a fruit garden, and a small range of glass, including a vinery, peach house, and conservatory. On the south side of the buildings there is a neatly laid out pleasure-ground. These various branches of this department afford to those pupils who have a taste for gardening an opportunity of qualifying themselves for discharging the combined duties of steward and gardener—duties which, from motives of economy, are now frequently imposed on one individual.

*The Farm Buildings.*—The visitor generally enters this large pile of buildings by an archway on the south side, leading into a yard 124 by 93 feet. In the centre of this yard is a solid two-story house, stabling and harness-room for six horses occupying the north side of the ground floor, the south side being appropriated to carts and implements. The second floor serves as a granary and store rooms. When this new range of offices was about half erected, the commissioners took advantage of a favorable opportunity that presented itself for enlarging the farm; and having to extend the amount of accommodation for live stock, they had to alter their plans. For instance, the building now occupied as a cattle barn was originally intended to serve as a barn and stable, and the interior still bears evidence of the existence of a division wall.

The portion of this building appropriated to implements, &c., is 13 feet wide by 53 long. There are four paved ways for carts, dividing it transversely. The wheels run on cut limestone stones embedded in the paving, and having shoulders which serve as guides for the wheels. These shoulders or guides are five feet apart.

The stables are 10 feet 6 inches high; front to back wall is 15 feet; the stalls are each six feet wide, so that the cubical contents appropriated to each animal is 945 feet, which would be rather limited without efficient ventilation.

The hay rack is beneath the horse's head. It rises 3 feet 3 inches above the floor, and is 1 foot 6 inches wide. This plan is now generally preferred to having the hay over the animals' heads.

The dimensions of the oat manger are 2 feet 2 inches by 1 foot 6 inches by 1 foot. The partitions consist of wooden boards kept fast by metal rails attached to the front wall (7 feet 3 inches from the ground) and to metal cylindrical posts (at the height of 4 feet 6 inches from the floor) which are 9 feet from the front wall. Over the animals' heads is a perforated sheet of zinc, for permitting the escape of vitiated air. Fresh air is admitted through the doors and windows. The upper half of the windows is constructed, in the ordinary way, of glass panes, and moves upon a pivot. The lower half consists of two sets of spars, $2\frac{3}{4}$ inches wide and $2\frac{1}{2}$ inches apart; the outer being fixed ; the inner slides right and left, so that the admission of air is simply regulated by the inner slide.

The stable doors are 4 feet wide, and like those of the barns, slide flush with the wall, on rails ; and to facilitate the movement, they are provided with castors running on the rails, and small wheels on both sides near the top.

The building facing the east side of the yard is the cattle barn, which is capable of accommodating 52 head of cattle. It is 98 feet long by 32 wide. There are two rows of cattle facing each other, and separated by a feeding passage 6 feet wide running the whole length of the building. This passage is lined on either side with cast metal rails or lattice work, which rise 2 feet above the troughs, and are attached to the cast-iron partitions. The space from the feeding passage to the side walls is appropriated thus:—Stand (to channel) 8 feet; channel, 14 inches wide (and 4 inches deep); passage behind animals, 3 feet 10 inches. The stalls are double, *i. e.*, the space between each pair of partitions is for two animals. The partitions in the southern half of the building are 7 feet apart, which gives 3 feet 6 inches as the width of each lair. In the northern half, generally occupied by the smaller breeds and young stock, the partitions are 6 feet apart, which gives each animal a space 3 feet wide.

The feeding troughs are made of slate slabs. The side slabs incline outwards, particularly the front one. The dimensions are—Front, 16 inches; back, 12 inches; width at bottom, 12 inches; top of front to that of back slab, 21 inches.

The channels behind the animals have been constructed in a very substantial manner. Perforated cast-iron plates cover a conduit of granite, semi-circular at the bottom, and having several openings communicating with a very copious liquid manure tank. When it is desirable to remove any sediment that may collect in the conduit, the cast-iron plates are removed. The feeding and other passages are paved with granite. The cattle floors on one side of the barn are paved with brick, having a fall of an inch and a half; on the other side the flooring consists of wooden spars nine inches wide and separated by one-inch interstices. About six inches beneath these spars is a solid floor of flags set in mortar, with a considerable fall towards one point, or sink for carrying off the urine.

The barn is well ventilated by large Louvre ventilators placed in the ridge of the roof. Fresh air is admitted, and particularly about the cows' heads, by the following contrivance: Under the feeding passage is a channel communicating with the external air at two points—at the south end wall, and at the open shed facing the stack-yard, and in which the root washer is fixed. This underground air channel has several branches rising to the surface of the feeding passage, and which are covered with perforated pieces of metal. Fresh air rises through these openings when the slide in the south end of the house is lifted.

At the rear of the barn is the manure yard. The site immediately occupied with manure is 86 by 53 feet; and between the manure heap and the barn is the receptacle for liquid manure. This consists of a large tank divided by a partition into two compartments, each 40 feet long, 8 feet wide, and 9 feet high to the spring of the arch. One compartment receives the urine from stables, barn, calf-pens, and piggeries; the other receives the liquid from the urinals, water-closets, wash-rooms, &c.

The bottom and sides of this tank were built of brick, lined with two coats of Portland cement; and a strong brick arch covers it.

A wooden shed, roofed with felt, has been erected against the east wall of the manure court to accommodate young stock. The length of the stands (8 feet) is the same as in the large barn already described. This shed is 63 feet long and 12½ feet wide.

The piggeries are placed on the north side of the manure yard. There are six sties with a southern aspect, each 10 feet 6 inches by 7 feet, with yards 16 feet by 7 feet. Torr's patent troughs are used. They are rather expensive; but the principle, (which is a good one,) can be easily applied in the case of ordinary troughs.

Piggery No. 2, placed in the middle of the range, and at right angles to the others, is arranged precisely like the calf-pens. There is a central passage 5 feet wide, on each side of which are eight pens or sties, each being 6 feet by 6 feet 9 inches. The sparred flooring was introduced in this house with more success than in the barn, the spars being 8 inches wide and $\frac{3}{4}$ of an inch apart: but litter cannot altogether be dispensed with. Some look upon this mode of housing pigs as objectionable, and at variance with that well-known instinct of the pig which induces it to keep its lair free fom its dung. At Glasnevin, pigs thrive very well in this piggery, particularly fattening pigs.

Over one side of this piggery mixed breeds of poultry are kept; the heat evolved from the pigs keeps up the proper temperature in winter. On the other hand, this arrangement was objected to on the ground that the air, which is occasionally unavoidably unpleasant, would be prejudicial to the health of the poultry, but experience has shown this not to be the case, which, however, may be attributed to the effective ventilation of the house.

A covered stair or passage rises from the manure yard on the one side, and from the stack-yard on the other, by means of which the poultry ascend or descend at pleasure. Strange fowls require a little training to induce them to reach their roosting and laying apartments, but it is interesting to witness how soon they become accustomed to their ascents and descents.

Immediately adjoining the piggeries is the calf-house, 21 feet 2 inches by 11 feet 3 inches, apportioned as follows: Passage, 5 feet wide, dividing six pens into two rows; each pen is 8 feet 2 inches long by 3 feet 9 inches wide. In an angle of each pen is a small rack for hay.

After inspecting the calf-pens, the visitor next passes along the open passage north of the barn and leading to the steaming shed, which is 44 feet by 16 feet. The feeding passage in the barn faces the doorway of this apartment. Metal vats were also used; but having lasted four years, they have been replaced by two fixed wooden ones, for preparing linseed, barley, bean, or oatmeal gruel, and a galvanized metal one, which turns on pivots, and is used for steaming roots. The latter is placed over a sunk trough, in which the steamed ingredients are mixed. This trough is 9 feet long, 3 feet 6 inches wide, and two feet deep, and is lined with cement. The wooden vats are 2 feet 9 inches diameter and 3 feet 4 inches deep. The metal one is about the same size. In one corner of this shed is a larger wooden trough, in which alternate layers of cut straw, roots, bean-meal, and oil cake are steamed for the milch cows in winter. It is 13 feet 3 inches long 5 feet 4 inches wide, and 3 feet high. A perforated pipe, communicating with the boiler, is laid on the bottom, and by turning a cock, the steam ascends through the mass and "cooks" it. At an elevation of nine feet there is a pipe perforated on the lower side, in communication with the water cistern, and by which an artificial shower can be made to fall on the surface of the steaming mess, and the ascending steam is thus condensed, and its escape prevented. Damaged hay, &c., is rendered agreeable to the cattle by this process. Bean straw, when steamed, is also readily eaten by cattle.

Turnip cutters are placed in this shed. There is a double-action machine for cattle and sheep. This is an excellent machine. A pulping machine is also used, and works very efficiently. It consists of a number of teeth arranged spirally around a cylinder, revolving on its horizontally-placed axis. The teeth pass between a revolving *spiral*, which prevents the machine from choking. A shaft, driven by the steam-engine, runs through the steaming shed, and if the engine is at work there is a piece of machinery partly at work in this shed, and partly in the open shed adjoining it, and facing the stack-yard. In this latter shed is a root-washer made of wood, and consisting of a frame containing water, in which revolves a skeleton cylinder, or, more strictly speaking, the frustrum of a cone, the taper being scarcely precipitate. At one end the roots are put into the cylinder, and an Archimedian screw at the other end raises and throws them on an inclined plane, whence they fall on the elevator, (formed of curved bars fixed to a leather belt kept revolving,) and which carries them to the steam-driven root-cutter. The cut slices fall into a wooden trough beneath the cutting machine in the steaming shed.

The next apartment is the chaff-cutting room, thirty feet by sixteen. Here is an oil-cake bruiser, an oat bruiser and a straw-cutter. Of straw-cutters there is a great variety; some cutting continuously, others giving an intermittent cut; some having knives attached to a disc or wheel, revolving in a vertical plane; in others the knives are attached to a revolving cylinder, and others again have the cutting blade oscillating vertically.

The revolving cylinder is preferred by some of the most competent judges.

Leaving this room, we pass on to the barn, the gable end of which faces the stables.

The ground floor of this building consists of: (1) mill room, (2) steam-engine room, (3) corn barn, or room for storing, &c., and which is 41½ by 21½ feet. On the second floor, 14 feet from the first, are—(1) the threshing room (same dimensions as corn room;) (2) dressing room, 21 feet 6 inches by 17 feet 9 inches, containing two fixed winnowing machines. This apartment is over the engine and mill rooms. As the grain leaves the last fanners it enters an opening, descending to within a few feet of the ground floor, and is received into bags. So that, from the time of putting the sheaf into the threshing machine till it is bagged, there is no intermediate manual labor. The hopper of the mill is in the corner of this apartment, so that the grain is easily transferred thither when required.

The steam-engine is eight horse power, but capable of being worked to ten. It is a high pressure engine, and has a vertical cylinder with an eccentric for pumping water into the boiler, the whole being firmly fixed on a solid floor of granite. The crank attached to the piston turns an axle, on which, at a few inches from the crank, a fly-wheel weighing one ton is attached, and which passes through the wall into the "corn" room, where motion is obtained from a double pulley on this axle, by means of belts. One belt is carried up to the threshing floor, for communicating motion to the threshing and winnowing machines. Another belt runs flush with this wall to another pulley, attached to an axle going through the same wall, for driving a "bevelled" wheel, which communicates motion to two shafts, passing in opposite directions—one to the chaff room and steam shed, the other running up to the liquid manure propeller and dairy. The threshing mill is on the Scotch principle, and absorbs four horse power. It has a covered drum with projecting edges as beaters. There is only one shaker, consisting of a revolving cylinder carrying spikes. The straw falls on an inclined plane, and is stored in an adjoining covered shed, opening to the east.

The threshed grain falls down to the first winnowing machine, which blows the chaff into a small apartment adjoining the straw shed. The grain falls out on the right side, and is elevated through a wooden tube (elevator) by a series of tin cups attached to a leather belt kept revolving while the mill is at work. The grain falls from this elevator into the second winnowing machine, and then into the third in the dressing room. Any unthreshed ears of grain that may have passed through the mill, fall to the left of the first winnowing machine, and by another elevator are brought up, and falling on the grain on the feeding board, are passed through the mill again and again.

A governor acts on a piece of sheet iron in the side opening of the fanners. When the speed of the fanners is fast, this piece of metal closes in, and thus diminishes the blast; when the speed is slow, it opens out and presents no obstruction to the ingress of the air.

The three fixed fanners described turn out the grain pretty clean; but for seed and other special purposes, Hornsby's admirable fanners have been recently purchased. This machine seems all that is to be desired. The dimensions are—length, 5 feet 4 inches; width, 2 feet 6 inches; height, 4 feet 3 inches; do. to top of hopper, 5 feet 6 inches. So far there has been no occasion to work the toothed cylinder, kept revolving amongst the descending grain, which forms so novel a feature in this machine.

Over the boiler is a kiln for preparing grain, &c., for the mill. The grain is introduced into the kiln, from the barn loft, through a sluice in the wall; and when kiln-dried it is removed into a sack in the corn room, through another sluice. The kiln consists of thirty plates, and seven malleable iron "wheeps"; the cost of which, including fitting, was £10 5*s*.

The stack-yard is a spacious area, walled in. Metal stands are used for the stacks. The pillars are cast-iron, and covered with caps, the convex side downwards. The horizontal bars are made of wrought iron or wood.

The liquid manure propellers are worked by the engine. This piece of machinery is placed in a small apartment, over which is the water cistern for supplying the boiler, taps in barn, cock in cooking shed, &c. There are two pistons, each four inches diameter and two feet stroke. It was estimated to distribute 4,500 gallons per hour; but in practice it never discharges more than 3,000 gallons in that time. The price of pump and belts, and fitting up, was £61 1s. The cistern, which is capable of holding 1,350 gallons, cost £38 13s. 10d.

The dairy has attracted a great deal of attention. The first feature that merits notice is the open shed, facing the yard, for airing the milk vessels, &c. It is 41 feet 6 inches long, and 11 feet 6 inches wide. A dairy usually contains three apartments: (1) kitchen, (2) churning room and (3) milk room; and if cheese be manufactured, an additional apartment is required.

Here the churning and butter dressing are performed in the dairy kitchen, which is kept most scrupulously clean. It is 17 feet by 14 feet 9 inches. It has a granite trough for washing vessels, supplied with hot and cold water cocks. The butter is dressed in a trough of polished slate flags, to the left as you enter. Its dimensions are—4 feet long, 2 feet wide and 4 inches deep. By turning the cock immediately over it, we have a supply of cold water; by lifting a tap in the bottom, this water escapes.

When the engine is at work, churning can be done by steam. The churn is placed in front of the cone, in this kitchen; and its axes being fixed in the cone, the churning proceeds. The extra expense for churning gear (viz., 34 feet of 2-inch shafting, 4 brackets, 5 pillow blocks, 9 bolts for brackets and pillow blocks; 1 shaft, 13½ feet long and 1½ inch diameter, in dairy; fast and loose pulleys, cone, fitting up, &c.) was £37, 9s.

Rowan's registered churn has long been used at Glasnevin, with most satisfactory results; and is the one generally used, though there are others of different constructions.

The milk room is 50 feet long and seventeen feet wide.* It is divided into two compartments by a transverse wall, having a large arched opening. There is a great variety of milk vessels: White earthenware, which is easily cleaned, but liable to be broken in the hands of careless servants; glazed earthenware, which is cheap and easily cleaned; glass, which for sweetness and cleanliness cannot be surpassed, but is too fragile and consequently too expensive; enamelled metal, which is all that could be desired, if the enamelling were only proof against the effects of hot water; zinc, which by some is considered objectionable on account of lactate of zinc being produced; and galvanized iron, which is admirable. All these vessels are shallow, the milk being about three inches deep.

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* Height to the ceiling, 9 feet 10 inches.

The milk stands consist of light skeleton metal frames, across which are laid two polished slate slabs; the first tier being 1 foot 6 inches from the floor; the upper, three feet; the width is 1 foot 4 inches. The windows (4 feet 9 inches high, by 3 feet 10 inches wide) are very complete, consisting of three distinct parts, each movable up and down by means of cords and pulleys. (1) Externally is a solid shutter of wood; (2) in the middle is an ordinary glazed window; and (3) inside these is a close cocoa-nut screen, which serves in summer the double purpose of excluding flies and keeping the apartment cool. By sponging it with cold water, in excessively warm weather, the evaporation reduces the temperature down to a moderate degree.

It takes from half an hour to an hour to churn with Rowan's churn. Butter produced in less than half an hour is too soft, and when the churning exceeds an hour the quality is seldom good. On on average it takes about ten quarts of milk to produce one quart of cream, or one pound of butter. It is found that about the same quantity of butter is produced, whether the whole milk or cream is churned. The average return from each of the twenty-six milch cows at the Albert Farm, for the twelve months ending 31st March, 1858, was £18, exclusive of the milk consumed by pigs and young stock.

There is a select agricultural library for the use of the pupils; a laboratory; and an extensive collection of minerals, dried plants and diagrams to illustrate the various lectures.

In addition to the machinery already described, there is a large and effective bone mill, worked by steam power.

The implements consist of ploughs, rollers, grubbers, the zigzag harrow, seed sowers, horse hoes and horse rakes, all of the most improved pattern.

The crops are chiefly wheat, barley, oats, mangel wurzel, Swedish turnips, potatoes, beans, carrots and Italian rye grass.

Model and other agricultural schools form a part of the system of agricultural education, established in Ireland by the commissioners of national education, which comprise several distinct classes of agricultural schools.

1. The Albert, or central institution, Glasnevin, which, besides being the centre of life and action to the entire scheme,

serves as a departmental section of the training establishment of the national board. Nearly 200 male national school teachers, who come up to Dublin annually for "training," are instructed in the leading scientific and practical facts of modern husbandry.

2. A class denominated "Model Agricultural Schools," which are either in connexion with district model literary schools, or specially established as an intermediate grade between the Albert institution and the smaller agricultural schools to be presently referred to. Of this class there were, in 1860:—

Twenty under the exclusive management of the national board, and eighteen under the management of local patrons, landlords, &c.

3. A number of small, called "ordinary agricultural schools," and which, like the model agricultural schools, are scattered throughout the provinces. Of these there were forty-seven in operation in 1859.

4. Workhouse agricultural schools: of these there were fifty-eight in 1859.

The agricultural education afforded in the workhouses consists of a certain amount of instruction, calculated to make the boys skilled in the execution of their future labors; and to raise their thoughts to a correct knowledge of the raw materials on which they will have to operate, and to the best and most economical ways of tilling the land and of disposing of its produce.

A certain amount of theoretic and practical knowledge is imparted in the school-room, which the boys reduce to practice on the piece of ground attached to the workhouse, under the direction of a competent agriculturist.

It is needless to argue that such a course of training as is afforded in those workhouse national agricultural schools must promote the interests of the nation at large. It has vastly benefited the poor themselves who have received it; it has benefited the rich by increasing the supply of skilled labor; it has benefited the tax-payers by diminishing the rates; and it has materially contributed to the harmony, peace, and prosperity of the country, by promoting habits of industry and that spirit of self-reliance which is the most efficacious preventive of crime. The payments made by the national board on account of this class of schools in 1859 amounted to £363 15s., or about £6

5s. per school. In forty-six of those schools, (whose returns have been published) one thousand seven hundred and eleven boys received the agricultural education above described, at an average cost of 3s. 4d. per boy.

Ordinary agricultural schools, as the name indicates, consist of ordinary national schools having a few acres of ground attached to each. In these schools the sons of farmers, laborers, and such others as may desire it, receive, in addition to the ordinary literary education, elementary instruction in the science and practice of agriculture. The little farms are, for the most part, worked by the boys. The teacher of a school of this class receives, in addition to his literary class salary, £5 a year and the profits of the farm.

The forty-seven ordinary agricultural schools in operation in 1859 cost £269 1s. 2d., or about £5 15s. per school. In forty of those whose returns have been published, one thousand three hundred and seventy-five boys received agricultural instruction at a cost of 3s. 4d. per boy per annum.* No money expended by the state could be productive of more benefit than the small sum expended on teaching those young lads—the rising small-farmers and laborers of Ireland—correct notions of the art by which they must earn their bread;—the art which is the staple industry of their country.

The outlay on "ordinary" agricultural schools is so trivial compared with the immense advantages derived therefrom, that, like the cost of agricultural education in workhouses, it may reasonably be doubted if any would object to it. When the commissioners of national education engrafted agricultural instruction on the ordinary secular instruction in some of their country schools, they observed that:—"Considering the very backward state of agriculture in Ireland, and that it forms the only source of employment for a vast portion of the laboring poor, we think it particularly desirable that a better knowledge of it should be promoted by means of the schools under us."

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* In the English agricultural and other industrial schools, the committee of council on education allow 5s. for each industrial scholar when a special industrial instructor is employed, and 2s. 6d. when the ordinary teacher conducts the industrial department. In addition to this allowance a grant is made to each industrial school equal to half the rent of the premises specially hired for the purpose, and one-third the cost for tools or raw materials for labor.

In certified industrial schools for vagrants, the sum of 6d. per day, up to a maximum sum of £7 10s. per annum, has been allowed from the education grant for every child received under magisterial sentence.—Vide *Parliamentary Estimate*, 1861–2. IV. 131.

Acting upon this principle, the commissioners encouraged, in every possible way, the teaching of agriculture in their country schools. For a long time they preferred employing the funds placed at their disposal in making small grants to a large number of schools to establishing a few costly model farms, believing that "the chief good that can be effected by the national board in the way of agricultural improvement is by blending, in as many national schools as possible, instruction in agriculture, and daily occupation in agriculture, with the literary instruction already given in those schools."

Concurrently with the introduction by the commissioners of agricultural instruction, on this inexpensive scale, into their country schools, many of the landed gentry took an active part in promoting the establishment of a class of agricultural schools on a more extensive scale than those previously existing. They deemed it all important that provision should be made for agricultural boarders, who, by a regular course of apprenticeship, would study the theory and the art of farming in a detailed and systematic manner, and who would, in after life, become intelligent farmers, land-stewards and agriculturists; in which capacities it was expected that they would amply reimburse the country for the outlay.

In this way arose the model agricultural schools, whose aim is higher and whose cost is greater than that of ordinary agricultural schools.

Of the model agricultural schools there are, as already mentioned, two classes:—

(1.) Those under the management of local patrons, who in most cases have erected the farm offices, and, in some cases, contributed the agricultural plant. With one or two exceptions, the teachers rent the farms from the patrons. The aid given by the board towards the maintenance of this class of schools consists of grants of agricultural books, and an allowance to the teachers for agricultural instruction and for the maintenance of boarding agricultural pupils.

The number of pupils educated in those schools in 1859 was—

| | |
|---|---|
| Agricultural boarders, . . . . | 62 |
| Agricultural day pupils, . . . . | 607 |
| Total, . . . . . . | 669 |

(2.) Model agricultural schools under the exclusive management of the board.—The farms attached to these schools are rented by the commissioners; the farm buildings were erected by them—aided in some cases by local contributions—and, with some exceptions, the farms are cultivated for and at the risk of the commissioners, by agriculturists, who are also charged with giving agricultural instruction in the schools.

The number of pupils educated in 1859 was—

| | |
|---|---|
| Agricultural boarders, . . . . | 154 |
| Agricultural day pupils, . . . . | 538 |
| Total, . . . . . . | 692 |

Two classes of agricultural boarders are admitted to these schools, namely, *paying* and *free*.

Paying pupils are submitted to a qualifying examination in the subjoined programme, so that none should enter with an education so deficient, that they could not fully benefit by the instruction afforded.

The free places are obtained by *competitive* examination in the same programme,* and such additional subjects as the candidate may be prepared in.

The cost to the pupils on these farms is from thirty to forty dollars a year only, for those who pay.

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* Programme of examination for candidates for admission to model agricultural schools:—

To know notation and numeration well, and to repeat all the more useful arithmetical tables. To work readily questions in the simple and compound rules of arithmetic. To distinguish readily, and with certainty, in any easy sentences selected from the daily lessons, all the parts of speech. To know the maps of the world and Europe. To write on paper a fair hand. To know and to be able to write down the characters or marks used in punctuation. To write down correctly easy sentences from dictation. To write out from memory the time and money tables. To read and spell correctly the words of an easy lesson, and to explain the meaning.

## *Time Table for Agricultural Boarders.*

| | H. M. | | H. M. | |
|---|---|---|---|---|
| At | 5 0 A. M. | | | Rise. |
| From | 5 0 | to | 5 45 | Dress and devotional exercises. |
| " | 5 45 | to | 6 30 | Feed and clean stock, clean yard, &c. |
| " | 6 30 | to | 7 0 | Wash and prepare for study. |
| " | 7 0 | to | 8 45 | Study agricultural subjects, and attend the lecture or examination of the agriculturist. |
| " | 8 45 | to | 9 0 | Prepare for breakfast. |
| " | 9 0 | to | 9 30 | Breakfast. |
| " | 9 30 | to | 2 0 P. M. | Feed stock and work on the farm. |
| From | 2 0 | to | 3 0 | Dinner. |
| " | 3 0 | to | 6 0 | Feed stock and work on the farm. |
| " | 6 0 | to | 6 30 | Prepare for study. |
| " | 6 30 | to | 8 0 | Study literary subjects under the superintendence of the literary teacher. |
| " | 8 0 | to | 8 30 | Supper. |
| " | 8 30 | to | 9 15 | Feed stock and arrange every thing for the night. |
| " | 9 15 | to | 9 45 | Devotional exercises and retire to bed. |
| At | 9 45 | . | . | Extinguish lights in dormitory. |

The above is designed for the *Summer* half-year; during the winter months the hours for rising, meals, labor, and instruction, must be regulated according to the season.—This table may be altered at busy seasons of the year.

## *Dietary for Agricultural Boarders.*

| DAYS. | Breakfast. | Dinner. | Supper. |
|---|---|---|---|
| Sunday, . . | Bread, ¾ lb.; butter, 1 oz.; tea, 1 pint, . . | Bread, 3 lb.; beef, boiled or stewed, ¾ lb., and vegetables,* . . . . . . . | Oatmeal, ½ lb., in stir-about, and skim-milk, 1 pint. |
| Monday, . . | Bread, ¾ lb., and sweet milk, 1 pint, . . | Bread, ¾ lb., and bacon, ¾ lb., boiled with vegetables, . . . . . . . . | Oatmeal, ½ lb., in stir-about, and skim-milk, 1 pint. |
| Tuesday, . . | Bread, ¾ lb., and sweet milk, 1 pint, . . | Bread, ¾ lb.; butter, 1 oz.; eggs, 2, . . . | Oatmeal, ½ lb., in stir-about, and skim-milk, 1 pint. |
| Wednesday, . | Bread, ¾ lb., and sweet milk, 1 pint, . . | Bread, ¾ lb.; 8 ozs. beef, ½ pint soup, and vegetables, . . . . . . . . | Oatmeal, ½ lb., in stir-about, and skim-milk, 1 pint. |
| Thursday, . . | Bread, ¾ lb., and sweet milk, 1 pint, . . | Bread, ¾ lb.; bacon, ¼ lb., and 2 eggs, fried, . | Oatmeal, ½ lb., in stir-about, and skim-milk, 1 pint. |
| Friday, . . | Bread, ¾ lb.; butter, 1oz., and coffee, 1 pint, . | Bread, ¾ lb.; fish, 1 lb., or milk, 1 pint, and butter, 1 oz., . . . . . . . . | Oatmeal, ½ lb., in stir-about, and skim-milk, 1 pint. |
| Saturday, . . | Bread, ¾ lb., and sweet milk, 1 pint, . . | Bread, ¾ lb.; 8 ozs. beef, ½ pint soup, and vegetables, . . . . . . . . | Oatmeal, ½ lb., in stir-about, and skim-milk, 1 pint. |

Where the pupils pay £8 a year, a somewhat higher scale than the above is used.

* Potatoes, when available, can be substituted occasionally for the bread at dinner.

The course of instruction comprises:—

1st. A sound English education, including reading, writing, grammar, and composition, geography, history, arithmetic, book-keeping, the elements of geometry and algebra, and land surveying.

2d. In the agricultural department—The elements of agricultural chemistry and of animal and vegetable physiology; drainage; tillage by manual and horse labor, with the description and use of the different implements necessary; rotation of crops; preparation of the soil for, time and mode of sowing, after-culture, harvesting and economizing the different crops cultivated; the best modes of collecting and preserving manures, with the nature and utility of stimulants and special manures, the crops to which they should be applied, at what time, and in what quantity; the breeding, rearing, house-feeding, and general management of the different kinds of live stock; and the mode of keeping farm accounts, &c.

The school farms are managed by men who were trained at the Glasnevin establishment, and who are expected to carry out the most approved and economical modes of farming. They are provided with improved farm implements, approved seeds and manures. The live stock is, in many cases, of pure blood, and, in some cases, pure-bred sires are kept partly for home use, and partly for the improvement of the stock in the surrounding country.

The farm offices are also arranged on approved principles, and substantially built.

It will be seen, from what has been said, that agricultural instruction forms a prominent part of the system of national education,—that this instruction is comparatively open and free to all who are prepared by an ability to pass a reasonable examination,—the cost being so low, as to bring its advantages within the reach of all classes. There are one hundred and thirty-four of these branch schools where agriculture is taught.

The Albert Model Farm and Institution, which stands at the head of the whole system, is worthy of the name it bears. The land of this farm is hired at four pounds, or twenty dollars, the statute acre a year rent, on a lease of nine hundred and ninety-nine years. Here the boys do all the work,—a man being hired now and then, as an exception, for some special employment.

The pupils range from seventeen to twenty-two years of age. They prefer that they would not enter under twenty. The land is rich and under a high state of cultivation, as it ought to be, to enable the institution to pay so high a rent.

Every thing about the farm-buildings is plain and substantial. The whole establishment, in fact, has an air of practical work. The dining-room is hung with the drawings and lithographs of prize animals. One end of it is used for a collection of implements, seeds, minerals, &c.,—all labelled. The school-room is furnished with plain, hard seats, vastly inferior in ease and comfort to those in any of our improved school-rooms; and hung with charts, maps, &c. It has various kinds of apparatus, thermometer, barometer; rain-gauge, on the outside of the window, &c.; globes, celestial and terrestrial, &c. The chemical laboratory is small and ill-supplied, compared with the same in most of the large schools on the continent, but probably sufficient for the limited instruction in this department.

The farm does not wholly support the institution. It would be unreasonable to expect it, with the high rent it has to pay, and the small amount required of the pupils, which covers board, washing, tuition, &c. I was told, the additional cost per pupil to the government was twenty-four pounds a year. But the farm itself, not charging it with the labor of the boys, shows a considerable balance in its favor.

The stock kept on both farms is, usually, seven horses, about fifty cows and young stock, two bulls, from forty to sixty sheep, and forty to fifty swine. The cows are mostly grade Shorthorns. There were two pure Ayrshires and one Kerry. They find that nothing exceeds a three-quarters Shorthorn for profit, when the product in milk and the economy of fattening afterwards is considered. From a three-quarters Shorthorn and one-quarter Irish cow, they get large yields. The bulls are worked in the fields, and this is thought to improve them. The pigs are Yorkshires and Berkshires. They are washed about once a week. The Berkshires are the most hardy, and can endure considerable rough usage; while the Yorkshires are a little tender, and are not so good nurses.

The price of ordinary dairy cows in this neighborhood is from twelve to fifteen pounds, or from sixty to seventy-five dollars;

but first-class cows for the dairy bring from eighteen to twenty pounds.

Vetches are sown in September, at the rate of two and a half bushels of seed to the acre. With us, they thought, it would be necessary to sow in April or May, and to sow about half a bushel of beans or oats with them, as a support to the stalk. They feed this crop out green for soiling. Sixteen varieties of Swedes are cultivated on two acres; and they say that none are better than Skirving's Improved,—the only objection to it being its bottle-neck. The Leicester Swede is exceedingly good. The best for the table is Laing's.

The flower-gardens and shrubbery about the house are kept in superb order; and, when I was there, every thing was loaded with luxuriant foliage and teeming with fragrant blossoms. Mrs. Kirkpatrick—to whom I was indebted for a great deal of civility—took great delight in showing this part of the establishment; much of it, no doubt, due to her good taste and skill in planning and directing.

This statement with regard to some of the principal agricultural schools in Europe might be considerably enlarged, but the practice and instruction in the others are so similar to those that have been given, that it is believed a pretty good general idea of them all may be derived from the foregoing pages. It has been seen, that a large and influential class of scientific men are devoting their lives to pursuits connected with this important branch of human knowledge; some of them in institutions designed expressly for this instruction, isolated and independent; others in connection with other institutions, old and long established.

It can hardly be denied, that it is an important incidental advantage to any country, resulting from the organization of agricultural institutions, that it creates a class of men who devote their higher intelligence and their entire lives to investigations designed to promote the advancement of science in its relations to practice. The constant contact with men learned in the other professions and sciences; the means of experiment and study at their disposal in a college for professional instruction, —like that at Hohenheim, for instance,—are eminently suited to form and develop those choice intellects which add to the glory of a country and the pride of the people. Well, indeed, has Hohenheim paid its debt in this respect; for, since its foundation, many scientific professors of distinction have spread throughout Germany and the world, the valuable practical knowledge acquired or taught by them at that royal institute.

The circumstances in which the European agricultural schools have grown up, and the state of society, are so different from our own, that it does not follow, that what would be best for them and for the condition of society which feeds them, would be best for us. I am inclined to think the system adopted at Glasnevin, at the Albert Model Farm, is better adapted to meet the wants of the present time and the present condition of things in Ireland, than a scientific institute connected with the University of Dublin, or with any other, would be.

Nor do I think that any impartial observer can fail to see, that had the agricultural college of Cirencester been connected with one of the universities, Cambridge or Oxford, it would be more likely to accomplish the ends which it now proposes to itself, would possess greater vitality, and receive a far more liberal patronage from the class of people it now aims to educate, than it does, or is likely to, in any time to come. It would have been able to secure and retain the highest scientific talent; while the farm which is now used simply as a model for illustration, on which the students do not work, would have been equally valuable and important on the downs of Oxfordshire or on the fens of Cambridge.

In Germany, where the experience has been longer than in any other part of Europe, the question of connecting agricultural institutes with others, or of having isolated and independent establishments, has long been agitated, and is now more warmly discussed than ever before; one party—and it is probably by far the larger—taking the ground for, and the other against such union; each governed, in a measure, no doubt, by personal experience in the one or the other system.

So far as I was able to inform myself, the ground taken by the advocates of a union with the universities is, that it is better for a young man setting out to procure a liberal education in agriculture, to lay the foundation in a thorough knowledge of general principles embodied in the wide range of sciences which bear more or less directly upon agriculture, and then to devote himself to the application of those principles by practical labor on a suitable farm or farms for one or more years, or till he becomes efficient in the manipulations. This course will be seen, on reflection, to be closely analogous to our present most approved modes of acquiring a thorough knowledge of law, medicine and divinity.

Suppose a young man wants to become a lawyer. Is it better to go first into the office of some successful man in large practice, where he must fall at once into the routine of office work, filling out forms, copying writs, looking up titles, and a thousand other details, or to study a year or two at a law school, under the guidance and instruction of the highest lights in the profession, where he will see little of the details of practice, to be sure, but where he can hardly fail, if he has any application at all, to obtain a widely extended general view of the great principles which underlie the whole structure of the profession, and where he can occupy himself "in tracing out the originals, and, as it were, the elements of the law," and afterwards go into an office and become familiar with the routine of practice?

Some would answer in one way, no doubt, and others in another. Some might regard the time at the law school as comparatively thrown away; others would esteem it as of the utmost importance. The latter would justify it by saying that the broad groundwork of general principles which the school would give the young man, would be of untold value in all the emergencies of after practice, while, ten chances to one, if he began with the details of practice, he would never rise to general principles. In the former case, after becoming familiar with general principles, a familiarity with practice must be obtained, as a matter of course, as every thing depends upon it.

It would be unfair, I think, to assert that the advocates of university teaching in Germany undervalue practice. If I understand their position, it is that the union of the highest education in the sciences and in the practice, is incompatible at the same time and in the same school, and they advise the pupil to begin at the fountain head and become well grounded in the scientific principles, and then to go on to a farm under a competent, practical man, and learn the details of farm management.

If this is a correct statement of their position, the idea of commencing in a lower grade school with the intention of going up into the higher scientific institute afterwards, as a sort of finishing off of their education, is equally impracticable; that is, according to them, it would be beginning at the wrong end. Whether they are correct or not, it is not for me to say; but I give it as the result of their long experience, and of their thought and observation upon the subject, and as such worthy of careful consideration in establishing similar institutions with us.

I do not know that it would serve any good purpose to enter at length into a development of the controversy now going on in Germany upon this question, owing to the fact, already intimated, that the state of society is so different, the lines of caste there so nicely drawn, and the objects proposed in an agricultural education so distinct from our own. But it may be remarked that Liebig has taken the ground very strenuously in favor of a connection with the universities, and that a great majority of the agriculturists adopt that view, or take a middle ground, that the location should be in the immediate vicinity of some established university, partly as a means of bringing the students under university laws, and partly as a means of giving the professors a higher position in the estimation of their pupils, and of availing themselves of the advantages of the collections, libraries, &c., which a university can offer, as well as of the talent of university professors. Volumes have been written upon the subject.

The question in favor of the universities has been fully stated in a work of 200 pages octavo, by Dr. Birnbaum of the University of Giessen, entitled *The Universities and Isolated Agricultural Institutes*, Giessen, 1862. He sums up in the following propositions:—

(1.) The simultaneous application of the practical skill requisite for management and the theoretical knowledge necessary for understanding the business, is inadmissible, and for teachers and pupils alike impracticable.

(2.) The practicing farmer, the practical man, is, as a rule, in all cases in which he directs his estate, not quite adapted to give instruction, not suitable as a teacher for beginners, but indeed—capacity and desire aside—to be recommended as a model and pattern for trusty young farmers well grounded in the elements.

(3.) Good schooling is most important at present for the farmer, and must therefore not be interrupted before the age of seventeen.

(4.) After suitable schooling the learning of the practice can be begun on such middling and smaller estates where the chief design is the education of young farmers, and where only a number of scholars proportioned to the circumstances of the farm are taken. When the instruction is finished through the assistance of schools where the languages and the applied sciences are taught, and others, nothing further will remain.

(5.) After a stay of one or two years in such a practical preparatory school, it is most judicious for the young man to serve some time as volunteer or under steward on a larger estate.

Now and then a change is to be recommended, though not too frequently.

(6.) Only well-trained young men should be admitted into the higher institutes.

(7.) The higher institute should have in view only the scientific training, such as answers for the higher development of the profession and science.

(8.) The most judicious location is therefore the university, in case a capable corps of instruction and requisite apparatus can be furnished.

(9.) The establishment of chairs of agriculture at the universities, and their adequate endowment, should be desired for the agricultural interest, as well as for all others.

(10.) The connection of scientific or other agricultural institutes with large estates, is only useful when these are carried on quite independently by themselves, and either the director, or perhaps one of the professors, has the management of the domain.

(11.) The farm property so situated will most judiciously be carried on as a model establishment, but in this case, without regard to the institute, and to secure respect, it should issue the most complete public accounts. Such an establishment need not be located in immediate connection with the institute of instruction, and may be from five to eight miles away.

(12.) A place and location for experiments, the special field of instruction belonging to the institute, should not be wanting, yet it should serve only for the purposes of science and instruction, and therefore not be carried on with reference to the highest profit.

(13.) The professors of agriculture should be fitly educated, practically and scientifically, and be appointed only on the ground of this special fitness.

(14.) The present stand-point of science requires the appointment of special professors for the more important auxiliary branches, and the holding of several departments by one person is impracticable.

(15.) The teaching of the auxiliary sciences is judicious for farmers, but never should be given as the so-called agricultural science.

(16.) The course of instruction in agriculture can be completed in two years only in case of a good preparatory education to begin with. Those less thoroughly prepared will have to devote one or more extra terms to the study of the auxiliary sciences. Institutes which profess to teach the whole of agriculture to those imperfectly prepared, in two years, are worthy of no confidence.

(17.) The student of agriculture must have full control of his actions, like other students, and not feel under restraint.

(18.) The connection of lower grade schools (where the pupils do the work) with the higher institutes, is to be rejected.

(19.) It is desirable, if the institutes are connected with universities, and properly founded and endowed, to have experimental stations, adequately endowed, created in connection with them.

(20.) The maintenance of institutes located from financial or other reasons in connection with a university, appears then the more secure, if reorganized and carried on according to this plan.

The great majority of what are called agricultural schools in Europe are mere manual labor schools, and on a very limited scale at that. In Ireland alone there are one hundred and thirty-four such schools.. France has three regional schools on the same footing as that at Grignon, though I believe the two others are not quite so flourishing, one agronomic institute at

Versailles, and many inferior schools, carried on in a small way, where, in addition to the elements of education, more or less instruction is given in agriculture, and where the pupils have to work; and this is the case in many other continental countries. In some of their schools the preponderance of other studies is so great that it is not easy to see why they are called agricultural schools. There are, besides, many special schools which are frequently called agricultural schools; as, for instance, the school for the management of forests, at Thärand.

It is desirable that we should fix in our minds some definite aim and develop beforehand the precise object that we wish to attain; that is, whether we shall establish a college on the plan of the higher scientific institutes abroad, or on that of the schools of practice, contenting ourselves with a lower scale of scientific attainment for the sake of the advantages of a more skilful, and perhaps a more enlightened practice. It is hardly reasonable to expect, if we may judge from the experience in other countries, to make thoroughly scientific agriculturists in the course of two or three, or even four years, if a large part of the time of the pupil is to be devoted to manual labor on the farm. At the same time it may be said that we do not wish to educate our sons so as to make them feel above work on the farm. No school that accomplished such a result would long commend itself to the confidence of the people.

The work of deciding this question satisfactorily and of carrying into operation a scheme of such magnitude as that now proposed in most of the loyal States of the Union is one of great difficulty and responsibility, and one in which the parties on whom the responsibility rests will need the confidence, the forbearance and the cordial coöperation of the people. It will require caution, judgment and practical wisdom, on the one hand, and a candid appreciation of the difficulties and the entertainment of reasonable expectations, on the other. It will require faith in the application of science to the improvement of practice. We know that it has elevated other arts, improved the appliances of labor and cheapened the production of the necessaries of life. Why should it not lead, within a reasonable time, to more enlightened processes of farm-work, bring mind and thought to bear upon the labors of the hand, and infuse new spirit into the whole farming community?

It was my intention to give some account of the incidents and observations along the route, somewhat after the manner of my last Report; but the sketch of the agricultural schools has grown up to such proportions, under my hands, that it precludes the possibility of doing so, owing to the length to which it would necessarily lead.

When in Paris, which I visited in August, for the purpose of seeing the school of Grignon and the celebrated flock of Rambouillet, I took an opportunity to visit the imperial dairy at Vincennes, some half-dozen miles from the heart of the city. The drive is one of great interest, a part of the way through a splendid park or forest, over a fine broad avenue. This dairy is far less splendid than that at Frogmore, near Windsor Castle, which I described, in considerable detail, last year. The land is poor and light, and the dairy business must be carried on at considerable disadvantage, one would suppose. But what nature does not offer, an imperial purse can provide; and hence the stock was looking finely, as might naturally be expected.

Of the sixty-eight cows which the emperor keeps here, the majority are Swiss, of the Schwytzer breed; such as I described as grazing the rich mountain pastures through the cantons of the Grisons, Schwytz, Uri and Unterwalden, nearly all of the eastern part of Switzerland, in fact. The remainder are mostly Normans, Flamands and Ayrshires. The Swiss give the most milk, and are considered the best, the dairyman said. The Flamands were rather large in size, good handlers, mostly red, with more or less white spots. The head is a good deal like that of the Ayrshire. They had the appearance of being very thrifty and fine milkers. The buildings are all one story only, with stone floors. The food is cut and prepared in an outbuilding, and run into the cow-house on a rail. The cows are stalled the year round.

There were also many swine, of the Suffolk and other breeds. A large flock of South Down sheep is kept here also, to supply the royal table with the finest and most delicate mutton. Speaking of sheep, reminds me, that in my account of the sheep of Rambouillet, I forgot to state the price at which they are sold. The director, Baron Daurier, in connection with the note, which is translated on a previous page, also said that the stock of the establishment was in great demand; the rams selling from 800 to 5,000 francs, and the ewes from 200 to 1,000 francs apiece, according to quality.

### EXPERIMENTAL FARM AT VAUJOURS.

One of the points of interest which I had determined to visit, during my stay in Paris, was the experimental farm at Vaujours, about a dozen miles from the city and almost in the midst of the old forest of Bondy, celebrated in the annals of crime, murder and highway robbery. This enterprise was undertaken to test the value and economy of the application of the night-soil or liquid manure collected from the city, with special reference to the crops to which it is naturally adapted; the best time and mode of application; and the obstacles, changes and modifications which seasons and climate, the markets, the supply of labor and other contingencies might suggest in its application. I accordingly prevailed upon my friend, Gov. Wright, to join me in the excursion, which we undertook without procuring references or letters of introduction; trusting to luck in finding a director who would take the trouble to put us in the way of picking up what suggestions the place afforded. Nor were we disappointed. In fact, my indifferent French was sufficient to make us an object of interest to any whom we might chance to meet. The only way, in such cases, is to bolt in and break the ice, by way of making a beginning. And so I inquired, at once, for the director of the establishment; told him who we were, the interest we felt in the designs of the farm, and requested, not only the privilege of looking round, but such documents as he could place in my hands, explaining the origin, and history of the farm and the series of experiments which had been made. These he kindly gave me, in the shape of two large octavo pamphlets, containing full details of each year's operations; promising to send a third, by mail, as soon as printed. This latter I have not yet received. The director holds the position of professor in the Conservatory of Arts and Trades, at Paris, and as he was obliged to leave soon for the city, he furnished us an intelligent guide to explain every thing on the place.

A company was organized, in 1856, with a capital of 100,000 francs, or $20,000, in shares, and a farm of 225 acres, leased for the purpose. Through it runs a canal, on which the night-soil is brought in boats, to the extent of 10,000 tons, which the company agreed to use upon the land; the city contributing $6,000 to the enterprise, and the government adding an annual sum of $800 to help start it, with the condition that the scientific and experimental character of the farm should be kept up.

It was rather an out of the way place, the roads in the neighborhood having been neglected and fallen into disuse; while there were not only no farm roads, but a lack of material to make them of. The farm consisted of two narrow pieces, one on each side of the canal, while the barn, and other buildings, were located at the extreme end, at a considerable distance from the canal and the bulk of the land to be treated; thus adding largely to the cost and difficulties of applying liquid manure in carts, as they undertook to do at first, and of teaming up the heavy forage crops. Distance required time of teams and men. The soil was in a poor condition and very foul, so heavy as to require thorough drainage; and that required a good deal of outlay to get a main drain with sufficient fall. Added to this was the difficulty of obtaining labor so near the city, where wages were high, raising the prices correspondingly in the neighborhood. The climate was rather cold and damp, owing in part to the proximity of the forest and the lowlands, over which the fogs hung much of the time; while another most terrible pest turned up in the shape of rabbits.

We, fortunately, know little of the misfortunes of a farmer in Europe, where the game laws take from him the right of protecting himself against the most frightful depredations upon the growing crops. Rabbits are everywhere destructive, and yet one can hardly pass a field of growing crops of any kind without starting up many of these pests. Prof. Moll quotes from a letter relating to this subject, which will throw light upon the extent of the damages sustained from this source, and I give it rather as one of the general causes of complaint in Europe, than as incident to this particular farm:—

"You start the blood from an open wound when you speak to me of rabbits. I pity you from the bottom of my heart, if you have this wretched race about you. You are indeed in the forest of Bondy, if you are to draw daggers with sportsmen. They think nothing but game worthy of consideration. Do your best to put rich harvests upon the sands of Sologne; establish, as you have done, a system which must multiply tenfold the production of meat; sweat blood and water to cheapen the means of living; it is all nonsense as compared with the noble sport of the chase; and yet here we are in the nineteenth century.

"Your position is such that you can make yourself heard at head-quarters; we have only one chance of safety, and that is, to demand the repeal of the law of 1844, which places the farmer at the mercy of game and sportsmen.

"The game has in four years devoured no less than $12,000 worth of my crops. I went to law for damages and got my case, and for one year's loss received $2,000, about half the loss; but I find going to law a bad business for a farmer, who has to neglect his work to tend to it, and I have come to the heroic determination to fence off 250 acres with close paling and lay the rest down to permanent grass, which will suffer less from the teeth of game. Now it requires a man from October to May to guard and take care of my five miles of fence, and to stop the gaps the rabbits make either by gnawing or burrowing under it. You see, therefore, that I have not got the rabbits down, as you seem to think, but have been driven to guard myself against them at an enormous cost; but I congratulate myself more and more every day at having adopted this means of defence."

In travelling in the railway, scarcely a field is passed without seeing more or less of these pests of the farm scampering off at the shrill sound of the engine-whistle.

There was not much except the facilities for water carriage, to offset these great drawbacks. The landlord, however, undertook to furnish money for roads, drains, &c., with a charge of six per cent. on the outlay to the amount of $6,000. The Canal de l'Ourcq, which cuts through the farm in a bed nine yards below the level, was built by the first empire, and the requirements of this canal led to the drainage of the property, which in winter had been a complete swamp. Then, in 1852, the Eastern railway came within six miles, and now a station exists only 4½ miles off, on that line, though judging from the time it took to travel it in the lumbering diligence the governor felt quite sure it was ten. In 1860 another line built a station at only two miles, so that the facilities of access are tolerable.

In addition, the growth of the suburbs of Paris is now so rapid that the depot for the night-soil of the city will soon have to be removed from Bondy much nearer to the farm, when better roads will be opened, giving nearer access both to Paris and to towns where large sugar refineries and distilleries are in full play, important elements of future success.

The construction of the railway through the farm led at first to serious difficulties. The engine-house for raising the liquid from the canal-boats had to be removed, and this caused a delay of the irrigation by pipes till the month of June, 1860. It also interfered with the outfall of the main drain so as to require a new-one, while the tunnel which passed under the canal had to be lowered, as it was brought into too close proximity with the reservoir. These operations were begun in the fall, but unfortunately the contractor failed, and yet the work had to be pushed forward at any cost, through rain and frost, hardship and danger to workmen, and teaming very wearing and laborious to the cattle, so that the work cost a thousand dollars, instead of four hundred for which it had been contracted.

As the plan of the application of liquid manure here was that of irrigation, by the tubular system, drainage was of course an essential preliminary. It was estimated that to drain the whole would require an outlay of $6,000, or over $25 per acre; so that a loan was effected. A competent engineer was employed to lay out and superintend the work, which was surveyed, certified and paid for by the government district engineer, the necessary advances being made as the work proceeded, bearing an interest of five per cent.

The main drains, two and three-quarter inches in diameter, follow round the hollows, between the undulating surfaces, converging towards an old waste, in which basins or sinks have been formed. Pipes, of a little less than an inch and a fifth (1.18) bore, are laid from 13 to 16 yards apart, at an average depth of 51 inches, in clay mixed with marl and sand. Air drains are run on a higher level, just as the head drains follow the depressions, and the top or head is indicated by an air-chimney, the same as in the lowest point of outfall, by the well which acts as a cesspool. There is thus a double circulation; whilst the water flows downwards the air is constantly mounting upwards, penetrating the soil and conveying oxygen to the manure, which is being consumed and transformed by the process of slow combustion. From the well or cesspool, where the main drains converge, a kind of twelve-inch tunnel is carried to the canal, at a depth of thirteen feet, and there it empties the drainage water. The cost of draining was not far from $30 an acre.

Then came the laying of pipes for irrigation, an expensive part of the plan. The cost of this is given in the annals at $9,140. This seems to be a very large outlay. The company had no precedents to work by, but were the pioneers in that kind of improvement, and experience is often very expensive. The work, it was afterwards estimated, might have been done at two-thirds the cost. But the most of the land has been brought directly under the tubular system, the few more distant pieces being within easy reach of the cisterns. The average cost of pipes and laying has been about $40 per acre, for the 225 acres.

Movable pipes, made of plate iron, $2\frac{3}{5}$ inches in diameter. and 26 feet long, were adopted as, on the whole, the most economical. To the end of the pipe an India-rubber $2\frac{1}{2}$ in. tube is attached, lined inside by a spiral thread of iron wire, so that sufficient play is had at the joint without diminishing the size of the pipe. Next to the India-rubber comes the male-screw of a bayonet-joint, and at the other end another screw, so made that the joint is united to the pipes by an iron collar, so that a half-turn of the screw makes it perfectly tight. The carriage and adjustment of the movable parts is easy. A cart can carry enough to lay a pipe 200 yards long. The workmen carry a length on their shoulders to where it is needed, and the ends rest on cross-stakes, where they are joined; a boy at the stopcock opens or shuts it as directed. The foreman works the hose, carrying in his arms one or more lengths, which can be attached to lengthen out the distributing pipe, from time to time, as required.

A thousand tons of liquid manure were distributed in 25 days, or at the rate of 40 tons a day. The machinery was kept at work only in the afternoon, as the morning was taken up in bringing the boat-load from Bondy. In the dry season the soil is diluted with three times its bulk of water, and then the same machinery will distribute 150 tons a day. The cost of a length or 26 feet of movable pipe of $2\frac{3}{5}$ inches bore, was about two dollars, which is about double the price of the fixed tubes of the same size. It is so easily laid, and the joints so well fitted that a $4\frac{1}{5}$ inch bore might be used instead of the smaller size which would discharge a stream equal to that at the point of suction.

The night-soil is taken from the cesspools with which each house is usually furnished, and which are emptied in the night once or twice a year by carts to which is attached a pumping apparatus which fits into an opening connected with the pits. The carts then carry the soil to a great sink just outside the city, from which it is forced by steam pumps to a great reservoir at Bondy, where it is partly dried and made into poudrette, or carried on by canal-boats to the farm at Vaujours.

Analysis shows that the night-soil of Paris contains about $7\frac{3}{4}$ lbs. of nitrogen, equal to $9\frac{1}{2}$ lbs. of ammonia, to the cubic metre, or cubic yard, which is a ton. It does not contain all the wash of the streets and the aqueducts, like the sewers of London, where an average ton contains only about $3\frac{1}{2}$ ounces of ammonia and 2 ounces of mineral matter. The *vidange* of Paris contains forty times as much ammonia per ton as the sewage of London, according to Prof. Voelcker.

The most economical mode of application was also to be tested. The barrel, either with or without the means for the even distribution of the fluid, has been in use in Belgium, in Northern France, and some parts of Germany and Switzerland, from time immemorial. It has the advantage of simplicity of construction and small outlay of original capital, but in the end, Prof. Moll says, it is neither simple nor economical.

"It has been my fortune," he continues, "to employ, under the same circumstances, the tubular system in its integrity; that same system, both aided by gravitation and in connection with the water-cart, and lastly, the cart filled by hand and emptied either by direct action or the use of the tub and scoop. The estimates I shall give are based on extensive trials, if not on constant practice.

"A few preliminary remarks are desirable. When liquid manure is applied to growing crops, it must be much diluted with water. If it is urine, with three or four times its bulk; if night-soil, with five or six times as much water, and then applied just during or after a rain, or otherwise the dilution must be still greater. Now at such times the surface is wet, and the passage of the cart without injury is out of the question. The cart then cannot be used for growing crops in the season of their growth, nor is it suited for winter use.

"Any attempt to distinguish between the use of concentrated and diluted manures on the same farm, with a view to the use of the cart in the former case, must practically prove a failure; the mode of application will vary for different crops.

"The importance which some of the opponents of the tubular system attach to the use of gravitation as a motive power shows that they are not very familiar with the subject. The great cost of the system consists not in the power, but in the pipes. Even in an unfavorable position where the boat to be unloaded is from ten to sixteen yards below the level of the fields, the cost of working the movable engine and pump comes to only one-fifth of the total cost of the apparatus. With a fixed engine it would be one-sixth, and with horse power only about one-tenth of the whole charge. Notwithstanding this and the high cost of coal at Paris, and also of the fact that our apparatus has not been in full work, doing only half or one-third the work which it will have to do in future, yet it costs us only 3⅘ cents to lift and spread a ton of liquid manure, and in this the cost of coal, oil and attendance come in for over two cents, and the interest and wear and tear of capital vested in the machine and pump a trifle over 1⅗ cents. And yet gravitation would save about a cent and a half on a ton.

"A considerable extent, not only of gardens, but also of arable lands in the south of France, is irrigated by means of machines driven by wind, steam and even by horses and mules, and from many facts collected on the spot, M. Gasparin gave the following estimate of cost:—

"To raise 10,000 tons 13 feet, the amount required to irrigate 2½ acres, the cost, by horse power, is . . . $25 60
" wind, from $16.00 to 40 00
" steam, (5 horse-power,) 8 87
" steam, (45 horse-power,) 7 80

"Now apply, instead of ten thousand tons of water, a fertilizing manure, which, diluted with four times its bulk of water, will not exceed 100 tons an acre, or at most 140 tons, and it is plain, that if the cost of pumping were two or three times greater than this, it would still be an insignificant item in the expenditure.

"The cost of applying liquid manure at Vaujours by the cart and barrel is as follows:—

| | |
|---|---|
| Cost of a boat-load of 40 tons, | $8 20 |
| Canal charges, | 2 12 |
| Average cost of emptying boat (3 dollars,) and carting, 800 yards, | 11 87 |
| | $22 19 or $40\frac{8}{10}$ cts. |

per ton. When the roads were bad we had to harness 3 horses to a cart. When every thing was in good order we emptied a boat-load a day with two carts, but in the winter of 1857–8, it took a day and a half."

A boat load, free from solid matter, was emptied, when the pumps worked well, in two hours. It was found that 20 tons was all that could be applied judiciously to an acre of cereals, but on forage crops, when one dressing is applied in winter and another in summer, this quantity could be exceeded. The summer dressing, it has been found from experience, must be diluted with three or four times its bulk of water. A given quantity is lifted by the pumps into a reservoir, then diluted and distributed through the pipes.

The enterprise had many drawbacks during the first three or four years from bad seasons. Cold and wet, dry and hot weather alternated, and well-nigh swamped the whole experiment. Sometimes the applications burnt the whole first crop of grass and carried the haymaking along into October.

A flock of sheep was started, but they were bought when everybody else was buying, and sold when everybody wanted to sell, and so resulted in a pretty large loss. Rye grass and water were found an unprofitable winter feed.

It was found that the crops lodged badly from over-feeding with a too stimulating application. Wheat was nearly abandoned on this account. Then the oats lodged about as bad, and increased the cost of harvesting. Then the crops of rape and rye grass began to show symptoms of weakness from the too abundant winter application, and it was found that the contract to apply 10,000 tons a year would lead to certain loss from this cause, and had to be modified. This want of equilibrium between the organic and mineral constituents of plants is less liable to happen if the application is made some time previous to seeding, and then followed by deep cultivation. The winter dressing requires to be moderate. If this caution is observed the first crop of rye grass will not lodge, and the second and third are less liable than the first to suffer. They also adopt the plan of feeding out the most luxuriant growth in April, thus keeping it cut down.

Under these circumstances, it will not be surprising that the balance stood on the wrong side. Many experiments had to be made,—in fact that was the object,—before they could get fairly started on the right track. It was found a very difficult problem to combine experimental farming with profit, but they felt bound to attempt to solve it. They set out to prove the value and efficiency of Parisian night-soil and the thing must be done, and that too, not on a small scale, which would be unsatisfactory, but on a large and generous plan, where the results must be of greater value. Moreover, the results must be ascertained with the most rigid accuracy, as otherwise they would be comparatively worthless. The whole crop in every case, had therefore to be weighed, as the only way to get at results which would be regarded as of the least consequence. To look on and guess that this crop is better than that, would not do,—so, too, for experiments, the soil must be uniform, and the ploughing, harrowing, manuring, and the seeding, must be done as nearly as possible at the same time, as a difference of only a few hours might make a great difference in the result.

It would be of interest, did space permit, to give the results of the various experiments in considerable detail. A general statement of an experiment is not worth much. The details are of the most consequence, but to give these would lead too far. It is possible that on the receipt of the later "Annals," now just ready, I may take an occasion to allude to them in some subsequent Report.

I will only state a few conclusions to which they have led. And first: night-soil, undiluted, used on crops in full growth in dry summer weather, is always more or less injurious, and to be avoided. It is generally useful if applied in rainy weather, but its action depends a good deal on the amount of rain before and after the application, the nature of the crop and the permeability of the soil. During a drought, on newly-mown fields, it produces no effect till after the first heavy rain. On bare ground, just before sowing, it seems to have an immediate effect, equal to a like weight of good barn-yard manure, and if applied at the rate of from 32 to 48 tons per acre, on clay soils, the effects are apparent two or three years. As it contains less nitrogen, weight for weight, than farm-yard manure, or 35 lbs. to 59, of the latter, it seems to follow that 49 lbs. of nitrogen in night-soil will have as much effect as 100 lbs. in farm-yard manure.

The most judicious mode of application is to mix it with from three to five times its bulk of water, and apply in spring, to young plants.

Applied in this way to beets, it produced 26 tons and 11 cwt. of clean roots per acre from 63 lbs. of nitrogen, while common manure, containing 448 lbs. of nitrogen, gave only 24 tons, 17 cwt. Each pound of nitrogen in the first case gave 935 lbs. of beets, and in the second, only 124 lbs.

Making allowance for the fact, that the virtue of the night-soil was wholly taken up by the crop in the one case, while it is generally admitted that only half of that contained in ordinary manure is used by the crop of beets, the proportion would stand as 935 to 248. The previous crop having been lucerne ploughed in, it is probable that the amount of vegetable matter in the soil, with the help of a wet season, aided the action of the night-soil more than that of the barn-manure.

Night-soil does not act on other crops to such a degree as on beets. Experiments made, give the crops on which the action is greatest, in the following order:—

1. Beets, turnips, Swedes, carrots, and cabbages.
2. Rape and hemp.
3. Green fodder crops, Italian rye-grass, Indian corn, and sorghum.
4. Cereals.
5. Potatoes, Jerusalem artichokes, green leguminous crops.
6. Pulse crops.

For all these, night-soil diluted with water, is far superior to barn-yard manure and to pure night-soil, however applied. The great superiority of the tubular system over the old way of the barrel and scoop, results from this superiority of diluted over undiluted applications. There is no economy of the latter system, if the bulk is to be increased four-fold.

It is a serious objection to night-soil as a manure for grasses, and particularly cereals, that, when put on in considerable quantities, say from twelve to twenty tons an acre, it causes rank growth, which, if the season is rainy, makes the crop lodge. But it seems to increase largely the percentage of nitrogen and minerals in green crops, and it is probable that it has a like effect on other crops.

Farm-yard manure, applied in a liquid form, proved itself far superior the first year to the same amount put on in the usual manner, and but little inferior the second year. It was found that tobacco, when grown with liquid manure, though fine in appearance, will not smoke well, and is only fit for snuff, and it had to be given up.

In a financial point of view, the experimental farm is not yet a success; but it is hoped that it will throw much light upon the questions it was intended to solve, and eventually pay.

The government of the Emperor is alive to the encouragement of agriculture by every means in its power. It pays a liberal salary to the members of the Imperial and Central Society of Agriculture; it awards large and generous premiums and medals for stock and implements every year in the twelve districts into which the country is divided; besides the frequent publication of elaborate and scientific works on agriculture, and encouragement to various societies and experimental and model farms under the direct control or patronage of the government.

A prize of one thousand dollars in money, and a silver cup worth six hundred dollars, was awarded last year to the owner or holder of the best-conducted farm in one of the six or seven departments of each of the twelve districts, besides medals and smaller gratuities to the managers and servants on these prize-farms. All these agencies are stimulating enterprise and competition in the highest degree. The amount given out in these various ways,—not including the imperial farms, like Rambouillet, Vincennes, &c.,—was $127,920 in money, and 4,920 other prizes and medals. Nor does this amount include the prizes for horses. They have distinct shows and special prizes awarded.

The farm prizes, or "Prime d'Honneur," are announced as "For the best managed farm, on which the most useful improvements have been introduced." Nor are those prizes confined to the large and wealthy owners of estates alone, whose great outlays may effect wonders in a short time, without regard to profit. They fall wherever they are thought to be most deserved by an impartial committee; often to those who have worked their way up amid a thousand obstacles, introducing improvement after improvement in the shape of better stock, better implements, and greater skill in management.

In the department of the Ardennes, for example, in the northern division, once an unbroken forest, and famous in the earliest records of the middle ages, on a poor soil, lying in a series of lofty plains, known as the "chain of the Argonne," consisting of broken rock, falling under the influence of the atmosphere into a kind of clay earth, the report of the competition for the gold medal describes the labors of competitors in detail, though in this locality the award turned on the introduction of a beet distillery as a basis for the production of roots, stock, manure and grain, on ordinary land, moderately good.

A farm of 1,000 acres, 770 of which were arable, and on which $12,000 had been spent in the last ten or twelve years, in improvements, carried off the palm. The rotation here was: grain, 360 acres; rape seed and roots, 180 acres; lucerne, sainfoin and clover, 180 acres; beans, 25 acres; fallow, 25 acres. The inventory of 1860 exceeded that of 1849 by $22,000. The accounts were kept in the most scientific manner. From them it appears that the erection of the beet-root distillery cost $3,020; that, with a working expense of 26 cents a day, the juice got from 5 tons 16 cwt. of beet, making about 2,100 gallons, is distilled. The spirit amounts to from 5¼ to 5½ per cent. or an average of two cwt. of beet produce 11½ gallons of pure alcohol.

Most of the competitors were owners of small farms. "The lineaments of wretchedness are uniform," showing against what obstacles, in the shape of poor and hungry soil, they all had to contend with. The general course of improvement was necessarily about the same, the first step being thorough drainage, and then deep ploughing and complete cultivation; then the collection of vegetable matter for compost; then the cultivation of clover and roots for stock, and finally the application of drainage waters for irrigation.

One competitor, M. Gossin, had 220 acres which had been under a lease for $200, and at the end of the lease, the tenant offering but $120, it was refused, when the owner, who had sent his two sons to the Agricultural College at Grignon, turned them upon the farm, after increasing it to 350 acres, where they were subjected to the jokes and ridicule of their neighbors. It was a " hard row to hoe," but by constant toil and the application of the knowledge and principles they had acquired, and which compensated in part for lack of capital and experience, they conquered circumstances, came out victorious, and found their neighbors laughing from the other side of the mouth. One of these sons is now a professor of agriculture and the other still sticks to the farm, using the improved implements which he got the hang of at college, laying dry swamps, tile draining piece after piece, which the brothers together had not completed, planting some parts to forest trees, and making model roads, and keeping clear and accurate accounts. " Accounts are a necessary check which never mislead."

Another competitor, to whom a gold medal was awarded for improvements in drainage, had a special difficulty to contend with, the choking of his pipes by a crust of oxide of iron, which he got over by scouring out the drains, from time to time, by means of a swift current of water from above. He had laid 97,000 pipes on 72 acres, at a cost of $19 an acre, including every thing. He uses all the drainage water to irrigate lower lying lands. He has brought up his live stock to a value of $4,300. His grain, stover and roots were estimated at $1,400. His implements at $900. The farm consists of 225 acres.

I might enlarge upon the means adopted in France for the encouragement of agriculture, through numerous societies and otherwise, but the foregoing will serve to show that they are of various kinds, as they are, no doubt, of various degrees of efficiency. They teach the young in a widely extended system of agricultural schools; they encourage the most expensive scientific experiments; they offer liberal prizes for the best managed farms; they publish public documents which throw our Patent Office Reports far into the shade, and adopt many other modes of stimulating competition and inquiry.

I had landed at Queenstown, in the picturesque harbor of Cork, for the purpose of reaching and visiting the Albert Model Farm at Glasnevin, near Dublin, and the other agricultural schools of Ireland under the direction of the National Board of Education. It was in the month of June, and every thing wore its loveliest hue; the rich luxuriance seeming to mock the sad condition of that unhappy country.

Nothing can exceed the beauty of this harbor where the whole English navy could ride in safety. Cork is thirteen miles from Queenstown, but a visit to Ireland without a sail through this grand basin, and up the River Lee, would be a mistake. The land seems to surround us all the way up the winding river, like a series of lakes. The hills are covered with every variety of foliage from the top to the water's edge. Pretty villas and ornamental cottages line the shores, while here and there an ancient ruin adds a charm unspeakable to the whole route. Here, too, the genuine Irish character is to be found in its perfection. Our low-back or jaunting-car, from Cork to Blarney Castle, was engineered by a true specimen, who gave us an infinite fund of amusement, by a running narrative of the characters along the route. "That place," said he, pointing to a fine estate that we were passing on the road, "that now belongs to a gintleman, a Scotchman, an' he's been dead three months."

"What do you call those flowers hanging over the wall?"

"Dem be Irish wall-flowers, sir," was his ready answer, though they had no farther claim to that designation than the fact that they hung over the wall.

Cromwell was his great bugbear, and the tales he related of that stern old Puritan gave sufficient evidence that he must have left his mark in that neighborhood.

"What are those white stone posts for?" pointing to several whitewashed stone pillars, in a pasture near by the road.

"Dem is for the cattle to rub on. They'll go wild unless they can rub themsel's. Cromwell was chained to one of 'em."

Looking through an oval peep-hole in the walls of the bridge near the famous Blarney Castle, an opening that had been left by the builder, we asked him how it came there.

"That was made by Cromwell's cannon, sir."

We found the shadow of this comical genius in our driver at Dublin. He tried to induce us to hire him to drive us out to some celebrated place in the neighborhood,—price, ten shillings.

"And you expect us to pay your extra drinking money?"

"Oh, no! I never drinks, only a little ale. I doesn't like water, except it's a little diluted."

The country in the neighborhood of Cork has been wholly denuded of trees, and all the forests to be seen have been planted artificially, mostly with the Scotch larch and the Scotch pine. A few beautiful English oaks are seen, here and there, overgrown with ivy, while the white flowering honey-suckle is running everywhere over the walls and hedges. Most beautiful effects are also produced by planting the laurel and the arbutus or strawberry tree, around the residences of many gentlemen. The cedar of Lebanon is also occasionally seen here growing in great perfection in ornamental grounds. It is a tree well adapted to our rural cemeteries, and I am surprised that it is not oftener seen in our own country. It is a half hardy tree and, of course, somewhat tender, but would probably do in sheltered places.

The country around here is pretty well cultivated, but in small patches, surrounded by stone walls, and hedges. Every thing is whitewashed, even the pillars and walls at the entrance of fine residences, and hence every thing has a mean and tasteless look which is offset only by the astonishing luxuriance of foliage of every description.

Blarney Castle is about four hundred years old, built by the McCarthys, in 1475. It is surrounded by a beautiful grove, and immediately behind there rolls a sluggish stream with extensive meadows on either side. The castle is in ruins and inhabited by rooks.

The lakes of Killarney are not far from the road from Cork to Dublin, and no one would think of passing without a sight, at least, of a spot so famous for picturesque beauty. They are in the county of Kerry. The country through which we pass is not of much interest. A good deal of it is low and swampy, and the houses, many of them, the meanest of mud hovels.

The Kerry cows are often sold here for from ten to twelve guineas, or from fifty to sixty dollars. The practice is for the dealers to buy them among the mountains, where they are to be had at from four to five pounds, or twenty to twenty-five dollars, take them down into the lowlands around Killarney, feed them up into condition, and turn them at fancy prices. They have the reputation here of being good milkers, many of them giving twelve quarts a day for eight months after calving. They are a hardy and useful animal, well adapted to the wants of the small cottager in this section.

One of the stout oarsmen who set us over the lakes of Killarney, in this county of Kerry, after telling a doleful tale of the hardships of the people of that lovely section, with little chance to earn even the small pittance of a shilling a day, closed pathetically by saying, —

"An' shure, yer honor, an' wouldn't we like to row you to Ameriky?"

A bugler acted as our cicerone, carrying his sweet-toned horn to show us the wonderful echoes of various parts of the lakes,—

> "Where the echoes hung back from their full mountain choir,
> As if loth to let song so enchanting expire;
> It seemed as if ev'ry sweet note that died here
> Was again brought to life in some airier sphere;
> Some heaven in those hills, where the soul of the strain
> That had ceased upon earth was awaking again."

This poetic bugler, after saying that America had given a home, employment and bread to thousands of his countrymen, wound up with the assurance that "The Irish never forget!"

Muckross Abbey, near the shore of the middle lake, is one of the most interesting of the ruins of this far-famed locality. Its lofty and graceful cloisters, overgrown with ivy and buried in a rich mantle of green foliage, are as beautiful as if they had been designed as the most perfect picture that could be imagined. In the very midst of this crumbling and picturesque ruin rises a gigantic yew tree, thirteen feet in circumference, whose stout arms actually support some parts of the massive walls. In this ancient abbey the nobility were buried, and the tombs of the O'Donoghues, the O'Sullivans, and the McCarthy Mor, are still well preserved, and green with creeping foliage. This ruin is still a place of burial, and has been occupied as such from time immemorial. Through the Muckross domain there is the most beautiful ride of eight miles around the winding shores of the middle lake, by Muckross head, that I ever beheld. Language can give but a faint idea of it, because the ever-changing hues, in the sunshine and the shade, must flash upon the eye to be appreciated.

And there, in the centre of the lower lake, lies the lovely island of Innisfallen, which Arthur Young, of agricultural memory, declared to be "the most beautiful place in the king's dominions, and perhaps in Europe." And who is not familiar with that most charming of melodies beginning with,

"Sweet Innisfallen, fare thee well;
May calm and sunshine long be thine;
How fair thou art let others tell,
While but to feel how fair be mine.

"Sweet Innisfallen, long shall dwell
In memory's dream that sunny smile
Which o'er thee on that evening fell,
When first I saw thy fairy isle."

Twelve hundred years ago, this enchanting spot was selected by the monks as the seat of a monastery, and a portion of its ruin is still to be seen. The soil on this island is very rich, the grass growing in extreme luxuriance, and nourishing a large number of sheep, while the magnificent arbutus which flourishes all through the lake region, here becomes particularly fine, owing to the mildness and moisture of the atmosphere and the soil, though it often rises from the clefts of the rocks, where it would seem to have little chance for support. Other fine timber trees cover this island, and lend it an unspeakable charm.

Ross Island, of a hundred and fifty-eight acres, and its fine old castle, now a majestic ruin, was another point where we landed, but it is impossible to give any adequate description of it. Its fine old castle was built in the fourteenth century by one of the O'Donoghues, and was the last stronghold of Munster to surrender to the parliamentary army in 1652. Like all other ruins in this country, it is one mass of ivy, of immense extent and richness of foliage, while the views from the top are of unsurpassed interest and attraction.

The raising of flax is increasing in Ireland, as a consequence of the high price of cotton. In the sections I visited, it is everywhere cultivated. Cork raises this year, 1863, no less than 662 acres, to 291 in 1862. Kerry has now under flax 380 acres, to 259 last year, and other counties in proportion. There are this year 214,092 acres in flax, an increase of 64,022 acres over the area in 1862. It was regarded as so important that a committee was appointed by the North-East Agricultural Association of Ireland, to prepare brief and simple

Directions for the Proper Management of the Flax Crop. These were printed in Dublin a short time before I was there. They were as follows:—

*Soil and Rotation.*—By attention and careful cultivation, good flax may be grown on various soils; but some are much better adapted for it than others. The best is a sound, dry, deep loam. It is almost essential that the land should be properly drained and sub-soiled; as, when it is long saturated with either underground or surface water, a good crop need not be expected. The sub-soiling should be executed the year of the green crop, so as to be completed at least two years before the flax is grown.

The best rotation is to grow after wheat, on average soils; but in poor soils, where wheat does not succeed, it is often better to grow after potatoes. Flax should on no account be grown oftener than once in five years; and once in seven, or even ten, is considered safer.

Any departure from this system of rotation is likely to cause loss and disappointment.

*Preparation of the Soil.*—One of the points of the greatest importance in the culture of flax is by thorough-draining; and by careful and repeated cleansing of the land from weeds, to place it in the finest, deepest, and cleanest state. This will make room for the roots to penetrate, which they will often do to a depth equal to one-half the length of the stem above ground.

After wheat, one ploughing may be sufficient on light, friable loam, but two ploughings are better; and on stiff soils three are advisable—one immediately after harvest, across the ridges, and two in spring, so as to be ready for sowing in the first or second week in April. Much will, of course, depend on the nature of the soil, and the knowledge and experience of the farmer. The land should be so well drained and sub-soiled that it can be sown in flats, which will give more even and much better crops. But, until the system of thorough-draining be general, it will be advisable to plough early in autumn to the depth of six or eight inches. Throw the land into ridges, that it may receive the frost and air; and make surface drains to carry of the rains of winter. Plough again in spring, three or four inches deep, so as to preserve the winter surface for the roots of the flax. The spring ploughing should be given some time before sowing, to allow any seeds of the weeds in the land to vegetate, and the harrowing in of the flaxseed will likely kill them, and save a great deal of after weeding. Following the last harrowing, it is necessary to roll, to give an even surface and consolidate the land, breaking up this again with a short-toothed or seed harrow before sowing, which should be up and down, not across the ridges, or anglewise. These operations can be varied by any skilful farmer, to suit peculiar soils or extraordinary seasons. The object is to have clean, fine soil, as like as possible to what a garden soil should be.

The rotation we recommend is :—

| RICH SOILS. | AVERAGE SOILS. | POOR SOILS. |
|---|---|---|
| 1. Grass. | 1. Grass. | 1. Grass. |
| 2. Oats. | 2. Oats. | 2. Oats. |
| 3. Flax. | 3. Potatoes or Turnips. | 3. Potatoes. |
| 4. Potatoes or Turnips. | 4. Wheat. | 4. Flax (*on half only.**) |
| 5. Wheat. | 5. Flax (*on half only.**) | 5. Hay. |
| 6. Clover Hay. | 6. Clover Hay. | |
| 7. Pasture. | | |

*Sowing.*—The seeds best adapted for the generality of soils is Riga, although Dutch has been used in many districts of country for a series of years with perfect success, and generally produces a finer fibre, but not so heavy a crop as Riga. In buying seed, select it plump, shining, and heavy, and of the best brands, from a respectable merchant. Sift it clear of all the seeds of weeds, which will save a great deal of after trouble, when the crop is growing. This may be done by farmers, and through a wire sieve, twelve bars to the inch. These sieves can be had in Belfast. Home-saved seed has produced excellent crops, yet it will be best, in most cases, to use the seed which is saved at home for feeding, or to sell it for the oil mills. The proportion of seed may be stated at one Riga barrel, or three and a half imperial bushels to the Irish or plantation acre; and so on, in proportion to the Scotch or Cunningham, and the English or statute acre, viz.:—about two and a half bushels for the Scotch acre, and about two for the statute acre. It is better to sow rather too thick than too thin; as with thick sowing the stem grows tall and straight, with only one or two seed capsules at the top; and the fibre is found greatly superior, in fineness and length, to that produced from thin-sown flax, which grows coarse and branches out, producing much seed, but a very inferior quality of fibre. The ground being pulverized and well cleaned, roll, harrow, and sow. If it has been laid off without ridges, it should be marked off in divisions, eight to ten feet broad, in order to give an equable supply of seed. After sowing, which should be done by a very skilful person, as the seed is exceedingly slippery, and apt to glide unevenly from the hand, cover with a seed harrow, going twice over it, once up and down, and once across, or anglewise, as this makes it more equally spread, and avoids the small drills made by the teeth of the harrow. Finish with the roller, which will leave the seed covered about an inch, the proper depth. The ridges should be very little raised in the centre, when the ground is ready for the seed, otherwise the crop will not ripen evenly; and when land is properly drained there should be no ridges. Rolling the ground after sowing is very advisable, care being taken not to roll when the ground is so wet that the earth adheres to the roller.

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* Omit flax in next rotation on this half.

*Weeding.*—If care has been paid to cleaning the seed and the soil, few weeds will appear; but if there be any, they must be carefully pulled; or cut with a knife, when the weeds happen to be large or when potato stalks appear. It is done in Belgium by women and children, who, with coarse cloths round their knees, creep along on all-fours. This injures the young plant less than walking over it, (which, if done, should be by persons whose shoes are not filled with nails.) They should work, also, facing the wind, so that the plants laid flat by the pressure may be blown up again, or thus be assisted to regain their upright position. The tender plant pressed one way soon recovers; but if twisted or flattened by careless weeders, it seldom rises again.

The weeding should be done before the flax exceeds six inches in height.

*Pulling.*—The time when flax should be pulled is a point of much nicety to determine. The fibre is in the best state before the seed is quite ripe. If pulled too soon, although the fibre is fine, the great waste in scutching and hackling renders it unprofitable; and if pulled too late, the additional weight does not compensate for the coarseness of the fibre. It may be stated that the best time for pulling is when the seeds are beginning to change from a green to a pale brown color, and the stalk to become yellow for about two-thirds of its height from the ground. When any of the crop is lying and suffering from wet, it should be pulled as soon as possible and kept by itself. So long as the ground is undrained, and imperfectly levelled before sowing, the flax will be found of different lengths. In such cases, pull each length separately, and, if possible, keep it separate in the pool. Where there is much second growth, the flax should be caught by the puller just underneath the bolls, which will leave the short stalks behind. If the latter be few, it is best not to pull them at all, as the loss from mixture and discoloration by weeds would counterbalance the profit. If the ground has been thorough-drained, and laid out evenly, the flax will likely be all of the same length. It is most essential to take time and care to keep the flax even, like a brush, at the root ends. This increases the value to the spinner, and, of course to the grower, who will be amply repaid by an additional price for his extra trouble. Let the handfuls of pulled flax be laid across each other diagonally, to be ready for the rippling, or the removal of the seed.

The subsequent processes of watering, spreading, lifting, drying, breaking, &c., have been so far superseded by our improved machinery, that I need not give them here. Indeed, mowing with a common scythe may now be adopted by us instead of the slower process of pulling.

## THE EXPERIMENTS AT ROTHAMSTED.

Rothamsted is some thirty or forty miles from London, on the great Northern Railway. Here have been conducted, for several years, an elaborate series of agricultural experiments, in the most scientific manner, by Messrs. Lawes & Gilbert, and on a scale of sufficient magnitude to make them of great practical and scientific value. I failed to see them while in London, in 1862, owing to a pressure of other calls upon my time, but I determined to let nothing hinder me if ever another opportunity should occur. And accordingly I spent a day there in September, in company with Governor Wright, whom I had persuaded to accompany me. Though many pages would be required to give the details of the important results to which they have led, and an account of the enterprise itself, I am compelled, from want of space, to pass them over with little more than a casual allusion.

The experiments with the grass plots, and the grains, interested me most. The land adjoining, which was similar to that on the experimental plots, has been left to show, by contrast, the effect of the different modes of treatment of these acre plots. This land is a strong clay, apparently better suited naturally to wheat than grass. It is not naturally good grass land; yet the experiments show that even on such land, any grass we please may be grown by the use of proper manures. The plots consist of one acre each, carefully measured off, and have been treated for seven years with such scientific accuracy and care, that the experiments may be relied on with implicit confidence. The results are very striking and instructive. They show that ammoniacal manures are especially adapted to produce a luxuriant growth of the cereal plants; that they have an effect on the quality, as well as the quantity of these plants; that mixed mineral manures, consisting of phosphoric and alkaline salts, largely increase the leguminous plants, such as the clovers; that it does not do to apply ammoniacal salts alone, but that a fair mixture of mineral and ammoniacal manures is best. They show that pastures can be improved to an almost indefinite extent by a liberal application of suitable manures. The land naturally would not, and does not, yield over a ton to the acre. The applications have, in some cases, increased it to over three tons per acre.

None of these plots have been under the plough within the memory of man, if I was correctly informed. On one or two of them a large amount of artificial manure had been applied, as high as eight hundred pounds in some instances, and the result had been to drive out the inferior grasses and to bring in the orchard grass so abundantly as to lead to the conclusion that all other grasses would be supplanted by this gross feeder. Other equally instructive plots serve to show that the cheapest mode of improving poor grass lands and to lead in the richer grasses, is to apply different kinds of manures, each particular soil, of course, requiring some specific manure adapted to its wants. Indeed, it is probable that we shall soon be able to tell, with the help of botanical and chemical knowledge, not only in what respect grass lands are defective, but what kinds of materials they may require to remedy the defect. The change effected by the different kinds of manuring is quite astonishing, and this change is strikingly perceptible.

Besides the experiments with grasses, similar ones are being carried on with wheat, barley and other crops. On one of the plots of wheat, which has grown the same crop for twenty years in succession, the yield this year was greater than ever, showing that by proper manuring this crop may be grown year after year on the same land, if we understand how to treat it.

A well-conducted laboratory is connected with the estate. We were shown over this as well as over the other parts of the establishment, and were well satisfied that no enterprise of the kind promises so much of value and importance as this to the agricultural community of England and America.

There are many other subjects to which I should be glad to allude had not this account already grown to a wearisome length. I trust that the observations I have been able to make as the result of a second trip to Europe, will not be wholly without their value and interest for those into whose hands they may happen to fall.

CHARLES L. FLINT,

*Secretary of the State Board of Agriculture.*

Boston, January 27, 1864.

# REPORTS OF DELEGATES

APPOINTED TO VISIT THE

# AGRICULTURAL EXHIBITIONS.

## ESSEX.

I had the pleasure of attending the forty-sixth annual exhibition of the Essex County Agricultural Society, held at Andover the 29th and 30th of September, as delegate from this Board,—one of the oldest and wealthiest societies in the State,—and, the weather being favorable, there was an immense concourse of people on hand. It was gratifying to know that the farmers' festival should create so much interest; indeed, few occasions, I think, could bring out in this quiet town a greater number of people, and all seemed to enjoy it hugely.

The annual meeting for the choice of officers and other important business usual on such occasions, was held on the first day of the show, and it never was my good fortune to attend an annual meeting of any society, where the attendance was so large, and the interest manifested greater, and I may also add, where general intelligence and argumentative abilities were better displayed. It brought to my mind the remark in the address to this society last year, that the society had never gone out of its limits for a speaker, and, judging from the ability there displayed, I think they may safely count on a home supply for, at least, the present generation.

The society has no grounds or permanent abiding-place, but holds its shows in different towns, thus accommodating all parts of the county. This has its advantages and also its disadvantages; among the latter is the impossibility of having the exhibition as uniformly interesting as they could, had they a location with grounds, buildings, &c., in other words, a home.

The exhibition of cattle was not large for so large a society, though creditable in numbers, more so than in quality; many of the best breeders in the county having no cattle on exhibition, which probably was owing to the itinerancy of the society.

Of entries there were of fat cattle, five. Bulls, of native or mixed breeds, six; foreign blood, four; cows, five; heifers, fifteen, comprising twenty-seven animals; calves, five, comprising nineteen animals; working oxen, twelve; steers, eight.

Horses were not numerous, consisting of brood mares and foal, three; team and draught horses, ten; colts, fourteen. There were some excellent animals, but as the accommodations for showing them were not good, it created little interest, compared with societies that have a track.

Not that I would have horses monopolize the interest of our annual fairs, but as horses are valued for what they can do, that is, all that can be got out of them, I think it a mistake not to give them a chance to show their qualities. Of swine there were twelve entries, and as a whole they were of superior quality, and showed attention to breeding that might be profitably imitated by the breeders of neat stock. There were about ninety sheep on the ground, mostly of the mutton varieties, and some of excellent qualities, but, as a whole, I did not consider them superior. There was one Merino ewe and lamb that were first-rate animals, and I hope the farmers in this county will look so well to their own interest that this class will not look so lonesome another year. The poultry exhibition was large, and I never saw it equalled at any county fair.

The ploughing match came off the second morning, and was quite a spirited affair. The ground ploughed by oxen was quite hard and somewhat stony, but was well done, and was contested by twelve double teams and three single ones. The plowing by horses was on another and easier piece of ground, and was done in good shape by four competitors.

The exhibition in the hall was good, consisting of the various articles usually on exhibition in such places, though not as large as usual in this department, I was told. I was unable to get the entries here, therefore have to speak in general terms. The butter was of excellent quality, samples few. In closing, allow me to say, that, in my opinion, the Essex County Society is one in which the masses take a deep interest, as manifested by the large attendance at the show, and also at the annual meeting for choice of officers, by their spirited debates on the various subjects brought before the meeting, but think they lacked a little this year in feeling their individual responsibility to bring out their best, so that the farmers' holiday should be one of the greatest events of the year. This was undoubtedly owing to the poor facilities for getting to the place of exhibition from the eastern part of the county.

MATTHEW SMITH.

## MIDDLESEX.

I received the appointment to attend the sixty-ninth exhibition of the old Middlesex Society with much pleasure, both from its historical associations and by having become interested in agricultural societies from reading the reports of that society some twelve years ago, which were presented to me by Hon. Simon Brown; but from the report of the delegate of last year, I had some fear that this society had lost its youth and vigor and declined into an inactive state of existence, but how was I surprised to find it one of the most active societies that I have ever visited, performing as much in one day as most others do in two.

First in order was the ploughing match, in which sixteen teams were engaged. The land was a sandy loam, the sward not quite as tough as I would wish, but as a whole the work was well done. I should have been better pleased if some teams had performed their parts at a more even gait, and one or two competitors had to prepare their ploughs after starting.

At the society's ground was the largest number of neat cattle that I have seen at a county fair. Most of the milch cows and young stock were thorough-bred; the Devon by Mr. Buckminster; Jerseys by Mr. Hurd; the fine-looking Dutch stock by Mr. W. W. Chenery, and the Ayrshires by Mr. Sheldon. There were grades and crosses of nearly all the pure bloods and natives, or what is so called, but it would be hard to prove that they were not tainted with some foreign blood.

The thorough-bred bulls were noble animals. Several yoke of fat cattle, one pair of noble fellows weighing over five thousand pounds. The working oxen were well trained and performed their parts as well as could be wished.

The ring for the exhibition of horses was not large enough to display them to the best advantage, although several showed good points. This department of our exhibitions creates more interest than any other, and well it should, for what could the farmers do without the horse, even setting fast trotters aside. As late as twenty years ago, when railroads began to increase, it was thought the value of horses would decline very much, or in proportion as railroads increased ; but how is the fact ? Why, to-day their value is about one hundred per cent. above what it was then.

I was surprised at not seeing a single entry of sheep except the texels entered by Mr. Chenery. He also had some Angora goats on exhibition.

Swine were well represented by the best breeds, from little pigs to large porkers.

Most of the poultry were of the Chittagong breed, and of these I can only say they are large eaters and small layers, so far as my experience goes.

I visited the hall before the crowd was admitted which enabled me to note the whole arrangement as well as the method and dispatch observed by their efficient superintendent, A. B. Moore, Esq., under whose hands the different articles seemed to take their places as by magic.

Apples were well represented. Pears not equal to exhibitions nearer Boston. Grapes, mostly native, their worthy president, Hon. E. W. Bull, not contributing from his large stock. Cranberries excelled in size. Vegetables, but very few on the tables, (and why not ?) Several samples of grains were seen, showing that these can be produced in quality equal to other States.

In the ladies' department, bread was in abundance and of the best quality. Butter of excellent taste.

Flowers were beautiful. Fancy articles were, as usual, well represented and made a fine display.

The officers and committees were performing their several parts with such zeal and dispatch that every department seemed to move in perfect harmony. In the afternoon the society assembled in the town hall and listened to the very able remarks of their president and a number of other gentlemen, which were of much interest to the practical farmers. I shall long remember the hospitality extended to me by their president and secretary.

JAMES THOMPSON.

## MIDDLESEX NORTH.

The annual exhibition of the Middlesex North Agricultural Society was held at Lowell on the 24th of September, 1863, which I attended by request of Hon. E. W. Bull, the regularly appointed delegate, who was confined to his house by sickness.

On arriving at the grounds of the society, every opportunity was afforded which I desired by the president and secretary, to facilitate the duties devolving upon me. I commenced my examination, beginning with the horses, of which there were the usual number of stallions, breeding mares and colts on exhibition, the quality of which was more ordinary than I expected to find at an exhibition of this society. The colts were of small size for their age, evidently showing that they had not had the good feeding required to make a good-sized horse, and which it is very poor economy to withhold from them, particularly the first two years of their lives. And among all the animals of the horse kind on exhibition, entered for premium, I did not see one extra animal, at which I was much surprised, knowing, as I do, that there are many fine horses and colts in Lowell and its vicinity.

In the cattle pens, I found some fine, large, good-shaped, fat oxen, such as would do credit to any exhibition in this part of the State. Quite a number of fine-appearing milch cows of native breed and one very fine Jersey cow, owned by Ransom Reed, Esq., of Lowell. There were some other cows of pure blood, and quite a number of grade cows. There were only two or three pure-bred bulls, and they were not such animals as would command a high price among breeders of cattle, and a number of grade bulls, to which at least it is of doubtful utility to award premiums. Also quite a number of heifers and heifer calves, many of which were promising animals, and a very fair show of good swine, and a few sheep.

One of the most noticeable features of the exhibition was the working oxen, particularly the string of twenty-five or more pairs of oxen from the town of Dunstable, almost all of which were fine, large, well-matched cattle, nearly all red in color, and were a credit to the owners, to the society, and to the town from which they were driven. There is evidently a worthy spirit of emulation existing among the farmers of Dunstable in respect to their oxen, as they were able, not only to make the fine show of working oxen, but many of the finest fat cattle exhibited came from the same place.

In the exhibition hall there was a very fine display, consisting of a fine show of manufactured articles and needle-work, tools, vegetables, a very good show of apples, many dishes of pears, some of them very fine specimens, and a good display of grapes.

The exhibition drew together quite a large attendance of the farmers and their families, and others interested in agriculture, who were thus enabled to compare the different breeds of cattle, horses, swine, and sheep; to examine the various kinds of fruit and vegetables; to admire the flowers, the needle-work, and fancy articles; and to listen to the interesting remarks of gentlemen at the meeting of the society. Such occasions cannot fail to exert a beneficial influence upon all who attend.

I left the exhibition grounds satisfied that the Middlesex North Agricultural Society is making progress and exerting a good influence in the district of its location, and that the bounty of the State has been judiciously expended.

JOHN B. MOORE.

## MIDDLESEX SOUTH.

As a delegate of this society, I attended to the tenth annual exhibition of the Middlesex South Agricultural Society, on the 22d and 23d of September. During the first day the time was mostly occupied in putting the different kinds of animals in their proper places, and in arranging the tables filled with vegetables, fruits, and flowers.

At nine o'clock on the second day, the ploughing match came off. Fourteen teams contested for the premiums. The work was all done well; but some better than others. The double Michigan, in my opinion, makes the best work, and is the most economical method of ploughing, taking into account the after-tillage and larger amount of crop at harvest. At ten o'clock, there was a trial of working horses, which was followed by a general exhibition of horses, on the track which has been constructed since the last exhibition.

The show of cattle was not as large as last year, although there were a good number of thorough-bred and grade animals; among the most prominent was a herd of 16 Shorthorns, owned by H. G. White, of South Framingham, one herd of Devons, owned by William Buckminster, of Framingham. Dr. Burnett, of Southborough, exhibited some grade Ayrshires and thorough-bred Jerseys.

The show of swine was very attractive; the breeding sows and pigs were excellent. There was a small show of sheep, but some of the pens contained animals of marked excellence. The show of fowls was fair, consisting of the different breeds from the Brama Pootra to the strutting Bantam.

The show of fruit was not large. Some fine specimens of apples were noticed. Pears and grapes were not very plenty, especially the latter. There seems to be a want of attention to the raising of small fruits, among the farmers generally,—a great mistake in my opinion, both in comfort and economy.

The exhibition of needle-work bore witness of the industry and skill of the ladies.

After the dinner was disposed of, the address was delivered by the Rev. J. C. Bodwell, of Woburn. His theme was agriculture, and as connected with it the duties, pleasures, and advantages of a farmer's life. The exhibition, on the whole, as far as I was able to judge, was well calculated to promote the cause of agriculture.

HENRY CHAPIN.

## WORCESTER WEST.

Having been appointed a delegate to attend the cattle-show and fair of the Worcester West Agricultural Society, which occurred September 24th, 1863, I attended to that duty, and report as follows:—

The day was fine, and the attendance large, and much interest was manifested in the main feature of the show, which was cattle. The farmers of Barre and the adjoining towns have taken great pains to improve their stock, by the introduction of thorough-bred males of the Durham or Shorthorn blood. They commenced about twenty years ago, and they are now reaping a rich harvest for their pains. One dairyman informed me that the amount of cheese made annually per cow was nearly doubled since the introduction of Durham blood, some dairies going as high as 650 pounds per cow. A few years ago, the sales from a dairy of twelve cows in one season amounted to eighty-six dollars per cow. Among the entries, were 17 bulls and bull calves, 46 cows, 36 heifers and heifer calves, 16 fat oxen, 3 steers, and 4 cows, 32 horses, 40 colts, 18 sheep, 21 swine, besides 5 litters of pigs. The ploughing match was advertised to take place at 8½ o'clock. I was upon the ground in season, but word was not given for the teams to start till a quarter past nine—a want of promptness I would not recommend to other societies to imitate. There were only five teams that contended for the premiums. They were all single teams, and fine-looking young cattle. They did their work well, although the sward was hard enough for a double team. There were ten teams that tried their skill in drawing. All the teams did well in drawing, but owing partly to the size of the load many of them failed in backing—a very important item in the education of oxen for the duties of the farm. The trial of horses I did not witness, as I was unable to be in two places at the same time. The pens were well filled with fine animals. Nearly every animal upon the ground was thorough-bred or grade Shorthorn. After examining an extra lot of more than forty milch cows, I came to the conclusion that I had arrived in the land flowing with milk, if not honey.

A team of thirty-two yokes of fine oxen added much to the interest of the show, which was thought, by good judges, to be better in some respects than any previous year.

The main feature of the show in the hall was a splendid lot of over one hundred cheeses. The show of fruit was good, that of vegetables very small; it should have been ten times as large. There were some specimens of manufactures, and some fine articles in the fancy department. The address was delivered by Rev. A. L. Stone, of Boston, said to be good, but having a position at a distance from the speaker, I was unable to appreciate its good qualities. After doing justice to a good dinner, a nice cheese was presented to the orator of the day, and another to the Hon. Oliver Warner, secretary of the Commonwealth. The show was a successful one, and it would be well if some other societies would imitate Worcester West in the improvement of their stock.

ABEL F. ADAMS.

## WORCESTER NORTH.

As delegate of the State Board of Agriculture, I was present at the eleventh annual exhibition of the Worcester North Agricultural Society, held at Fitchburg on the 29th and 30th of September.

Every arrangement seemed to have been made by the efficient officers of the society, to render this show interesting and useful.

The upper room of the town hall, a spacious and beautiful apartment, was well filled and handsomely arranged with products from the fields and gardens, fruits from the orchards and fruit-yards; together with beautiful and handiwork of the ladies, both ornamental and useful; with a good display of the fine arts and mechanics. There was no public exhibition on the first day. Committees occupied the hall in the afternoon, attending to the duties of their several appointments. The hall was open to the public in the evening. Tables arranged through the centre were filled with fruits, domestic manufactures and mechanic arts.

There was a fine show of apples and pears, though less than last year, as I was informed by the secretary, of more than one-half; but if less in quantity, I think they could hardly have been excelled in quality. There were 298 plates of apples, containing a large number of varieties, and the specimens generally large and fair. 257 plates of pears were exhibited, of most approved varieties, many of them of rare excellence in size and beauty; and could a more thorough examination have been made, I have no doubt it would have been found that the outward was a true criterion of the inner quality.

Among the contributors were Dr. Fisher, W. G. Wyman, Dr. T. R. Boutelle; Messrs. Crocker, Leath, Sawyer, Works, Twichell and others, of Fitchburg, and Mr. Fay, of Ashby. Of the two first named, the State Board have had ample knowledge of their skill and success in the cultivation of fruits of various kinds; and while, in most parts of this Commonwealth, success is sure to follow skilful cultivation, I cannot but think this a favored section for fruit-growing.

Grapes, in splendid clusters and great profusion, graced the tables. Delawares, Concords, Rebeccas, Dianas, with some other kinds, composed the varieties. The contributors were nearly the same as of the other fruits. The Delawares, by C. A. Emory, and others, were very fine, and the Concords, by W. G. Wyman, were very large and nice.

On the sides of the hall were arranged the cereals, roots and vegetables of all kinds, and some of the vegetables large enough to satisfy any one. The dairy was but very slightly represented. There were a few boxes of butter, that looked inviting, and only two samples of cheese. But little attention is given, by the farmers in this section, to making cheese; they generally, I believe, produce milk, for which they find a ready market and, I have no doubt, at a more remunerative price than to manufacture into butter and cheese; and thereby relieve the female part of the family of much care and labor. The upper end of the hall was rendered attractive by the exhibition of drawings and paintings, with some of the mechanic arts. Specimens of Mr. Sawyer's projectiles, manufactured in Fitchburg, are among the articles of interest at this time.

At the lower end of the room were patent articles, such as are vended about the country and found useful in every family. Among them I noticed a basket for gathering and emptying fruit, simple but useful. An admission fee of ten cents was required of every one visiting the hall, and at an early hour in the evening the space around and between the tables was filled; every one seeming to have felt that the evening would be the time when it would be least crowded, and that very fact made it a perfect jam. But all seemed willing to be in it, bear and even to enjoy it. Over twelve hundred persons visited the hall this evening, and the receipts the next day showed an attendance of over twenty-five hundred.

The principal and most important day of the show was on Wednesday, one of the finest of autumnal days. At an early hour in the morning the main street began to be thronged with people from the avenues leading from different towns as well as railroads, showing that a good time was expected and all intended to enjoy it. A programme, in full, was prepared and printed, on the reverse side of the business card of a merchant of this place, Mr. J. E. Manning, at his own expense; and these, liberally distributed, were a very convenient reference; and as promptness was the order of the day, every one having a card knew when and where to be at the right time and place.

The ploughing match was an interesting part of the exhibition of this day, inasmuch as ploughing is the first important operation of the farmer in preparing his ground for the future crop; and the ease of after cultivation, and the yield, even, of the succeeding crop, depends much upon the manner in which this work is done. There were twelve competitors, three with double teams, six with single, and three with horses. A large number of interested spectators were present, to witness the skill of the ploughmen in performing their work, which was generally well done. I noticed two boys, with their two pair of steers and plough, doing good work. And this society, as an inducement to minors to compete with their seniors, in case a premium is awarded increase it fifty per cent. This example other societies would do well to follow.

The exhibition of draught horses and oxen was said to be very good. I regret to say my attention was called to something else at the time, and failed to see this part of the show. The whole number of entries of stock, as handed me by the secretary, was 506, as follows: Blood-stock 47, bulls 14, working oxen 34, milch cows 20, fat cattle 8, heifers 51, steers 66, swine 113, sheep 65, and horses 78. The neat stock, sheep and swine were exhibited in pens, excepting the oxen and steers, in yoke; these were arranged around the pens and confined to posts, thereby giving a fine opportunity for inspection. Among them were some large and well-matched oxen and promising steers. There was one pair of oxen exhibited, weighing 3,590 pounds, said to be native. It is a rare instance to find cattle, in the interior of this State, other than thorough-bred or grades from them. Such has been the interest to introduce the several kinds of improved stock from abroad, that there is hardly a herd that has not some of this foreign blood in their veins. Among the several classes were some very good cattle, reflecting credit upon the owners, showing judgment in selecting and care in keeping. The interest of this part of the exhibition was increased by the presence of a number of thorough-bred Shorthorns, brought in by H. G. White, Esq., of Framingham, for exhibition only. Mr. A. O. Cummings and Messrs. A. C. and J. G. Wood, of Millbury, were large contributors of thorough-bred Shorthorns. Mr. Cummings found a purchaser from New Hampshire for his bull exhibited. The number of sheep on exhibition showed a growing interest in this part of husbandry. Mr. White exhibited Cotswolds and the Messrs. Wood, South Downs.

At one o'clock the members of the society and invited guests partook of an ample dinner at the Fitchburg House; after which a procession was formed, and marched, under the escort of the Ashburnham band, to the Unitarian meeting-house, where were the following interesting exercises: First, prayer by Rev. Mr. Heard; after which an original hymn, composed by Mrs. Caroline A. Mason, of Fitchburg, was sung by the choir. Mrs. Mason also contributed a poem, which, after the address, was read. The address, by Luther H. Tucker, Esq., of Albany, junior editor of the "Country Gentleman," was listened to, by a large audience, with much interest and close attention, and the members of the society, by a subsequent vote of thanks and a request of a copy for publication, evinced their appreciation of it.

After the poem the society repaired to the lower town hall, as announced in the programme, "for speeches and award of premiums;" but the lateness of the hour precluded any thing but a few remarks from your delegate and a short speech from the orator, Mr. Tucker; the society requiring the time for the necessary transaction of their business. It has been thought by some that the exhibition of horses is the most attractive feature of our agricultural shows, and that they usurp to this class of animals the legitimate objects of these exhibitions. On this occasion there was a national horse show at the trotting park, some two miles from the village. I cannot say how attractive it was or how many were present, but, judging from the numbers present at the village during the day, one could hardly feel that the horse-show, with its attractions, had been any injury in this case. Finally, I think great credit is due the officers of this society, for their exertions and skill in the arrangements, and the people of Fitchburg and neighboring towns generally, for the interest shown in making this show, as it was, a decided success. And whatever may be said against agricultural exhibitions, I have no doubt the people of Fitchburg and vicinity feel, and have reason to, that the improvement in their cattle, their improved crops and greatly increased fruit culture, are owing much to these exhibitions. The farmers' club, formed there, perhaps in consequence, is also another advantage to the farming interest in that place.

In closing my report, I with pleasure make mention of the cordial reception I received, as the delegate of the State Board, from the President, L. H. Bradford, Esq., and the Secretary, W. G. Wyman, and others, and their kind attentions, shown me during my stay, rendered my visit to that society very pleasant.

HOLLIS TIDD.

## WORCESTER SOUTH-EAST.

The annual exhibition of the Worcester South-East Agricultural Society took place at Milford, on Tuesday and Wednesday, September 29th and 30th. This was the fourth anniversary of the formation of the society; your delegate well remembers the first exhibition. The display of cattle, horses, and swine, was such as almost to discourage those who had the interests of the society at heart; and nothing but a large and beautiful collection of articles of domestic manufacture in the hall, and a vast concourse of people at the public exercises, gave any promise of success to the enterprise.

The spirit which was then manifested by the people, has, in the short space of four years, developed one of the most prosperous societies in the State. The agricultural enterprise of this section of Worcester County has been so stimulated by the association, that the farmers now present an admirable collection of products, and a choice gathering of farm animals. The agricultural resources of the region have been largely increased under the same fostering influences. Previous to the organization of the society, a large portion of the vegetables consumed in the thriving town of Milford were brought from Boston. Now, the lands in the vicinity of the town, subjected as they are to careful cultivation, produce abundantly for all the wants of the people, and there are constantly recurring evidences of the beneficial effects of this newly-formed society.

The exhibition this year bore unusual marks of zeal and determination on the part of the managers. The accommodations for animals which, had, in former years been found ample, were by no means sufficient for those now brought upon the ground. The large herd of Harvey Dodge, Esq., of Sutton, well known for his skill and enterprise in breeding Devons, attracted great attention. He exhibited forty-two animals of various descriptions, twenty-two of which were oxen, matched in size and shape and color, as the Devon may be. B. D. Godfrey, of Milford, presented a fine show of Jerseys; and from Mendon and other towns, were brought many valuable cattle to increase the interest and importance of the exhibition.

It is seldom that any exhibition brings out a more striking class of horses than did this. Mr. Godfrey, of Milford, has long devoted himself to the breeding of colts from the stock of the famous trotting horse, George M. Patchen. On this occasion, he exhibited five colts of different ages, remarkable for style, size, and strength; six other colts, of the same breed, attracted general admiration. The trial of these, and other horses, on Tuesday, presented an interesting display of this class of animals for the purposes of the road and farm work.

In the town hall, were many interesting specimens of the ingenuity of the citizens, and an excellent collection of many varieties of fruit. It is evident that in the cultivation of vegetables and the finest fruits, very successful efforts have been made in this section.

On Wednesday, at an early hour, an exhibition of working oxen took place, which would have done credit to any society in the State. There were seventy-five pairs of as good cattle, well adapted to farm work and to economical feeding, as are usually to be found. The ploughing, for competition, in which there were eleven entries, eight of oxen and three of horses, was done with great skill, and with as much expedition as is compatible with good work.

After these exhibitions of practical agriculture, the literary and festive exercises of the occasion commenced. Without dwelling in detail upon the merits of this part of the exhibition, it seems proper and important to say a word in support of every effort to encourage the intellectual activity of our people, and to afford them frequent means of social intercourse. A public address, a public dinner, music, and speeches at the tables, should never be neglected on an anniversary like that which calls the farmers together to exhibit their flocks, and herds and products. It is not to be supposed that on such an occasion no words of practical wisdom will be dropped by the speakers. But even were this the case; were agricultural topics entirely neglected, and were the hours spent in displays of oratory upon less substantial subjects, the enlivening influences which attend even this mode of intellectual exercise, form one of the most useful parts of such occasions. It is to be hoped that in the zeal for agricultural advancement, the healthy enjoyments of the day will not be forgotten. They were not omitted at Milford; and they should not be laid aside by any society in the Commonwealth.

GEO. B. LORING.

## HAMPSHIRE, FRANKLIN AND HAMPDEN.

As delegate from this board, I attended the annual exhibition of the Hampshire, Franklin and Hampden Agricultural Society, held on the society's grounds in Northampton, on the first and second days of October.

In visiting the show of this old and prosperous society, I had raised in my own mind high expectations; and taking the whole exhibition into account, am happy to say, I was not disappointed.

The weather was remarkably pleasant, and the people fully improved it by a very large attendance on both days, and by large contributions, of all kinds which usually grace such an exhibition, with the exception of sheep and swine.

The show of cattle, on the first day, was very large, and well worthy the efforts of the contributors. And here I would respectfully suggest, that if the cattle could remain on the grounds of the society throughout the first day, or at least till four o'clock in the afternoon, it would add very much to the gratification of visitors, and very much enhance the usefulness of the society. The stock began to be removed about two o'clock of the first day.

Three hundred and eleven cattle, of all breeds, were on exhibition the first day, including many very fine animals of their class. But the favorite and most noticeable breed was the Shorthorn (Durham.) The most attractive feature of the cattle department was the oxen. Conspicuous among these were the oxen of Mr. Fowler, of Westfield, Mr. A. P. Clark's, of Easthampton, Mr. Johnson's, of Hadley, Mr. John S. Anderson's, of Shelburne, and the "town team" from Hatfield. There were others showing very fine oxen, deserving of notice, would space permit. In fact, I saw no poor oxen there. They were all fit for the shambles or the stall, giving ample evidence of the care they had received, and of the luxuriant pastures which had sustained them during the summer—pastures that cannot be found in all parts of the State.

I should do injustice to the exhibition, did I not make special mention of the very fine herd of twenty-two head, owned and raised by Mr. John S. Anderson, of Shelburne. They were nearly all grade Durhams, of the old Northumberland stock. They were bred, evidently, more for beef than for the dairy, attaining great weight of carcase at early maturity. One pair of steers, two years old, weighing, 3,040 pounds; and another pair, same age, weighing 3,000 pounds; one two-year old heifer, weighing 1,360 pounds. Two cows, five years old, weighed respectively 1,750 and 1,700 pounds; one pair of calves, seven and nine months old, weighed together 1,390 pounds. Mr. Anderson, evidently with a calculating eye, has consulted his surroundings, and finds that his fine pastures and his farm together, situated at a distance from a central market, and with the kind of stock under his control, will return him for his skill and labor more profit in beef than in any other product. One thing, I think, should have been required of him, or of any other stock breeder claiming a herd premium, by the officers of the society; and that is, a written statement of the manner of treating his stock, from the time the calves are dropped till they are two years old, at least.

I would also, in this place notice the extraordinary oxen owned and fattened by the Messrs. Day Brothers, of Northampton. These oxen were so large and fat that they could not be driven to the society's grounds, a distance of one and three-fourths miles. They reached the village main street, but could not be driven further without serious damage. The owner then very kindly invited all who desired, to visit his premises and see the largest and heaviest oxen ever seen in this State. These oxen were a grade Shorthorn, and were raised by ——— Cushman, of Wilmington, Vermont. These oxen were sold one year ago to Byron Lawrence, of New York city, for one thousand dollars, and were carried to New York, but when they arrived there, they appeared so active and thrifty, Mr. Lawrence agreed with the Messrs. Day for the sum of five hundred dollars to take the oxen back to Northampton, and feed them another year. These oxen girthed ten feet and five inches, and are said to weigh rising of eight thousand pounds, are well matched, and of very fine form.

The show of sheep was small. Only about twenty were on exhibition, including Cotswolds, South Downs, and Spanish Merinos. The merits of sheep husbandry are sufficiently discussed at present, without any comments of mine in this place. But little attention appeared to be given to swine. Only one lot was shown, and that by Dr. Prince, from the State hospital. They were a large breed, called the Yorkshire. Pork is one of the most reliable articles of food for the masses, and for our armies, and is particularly important as an item of national wealth.

In the afternoon, at three o'clock, a large audience collected in the upper hall of the society's building, to hear Judge Thomas Russell, of Boston, the orator of the occasion, and for more than an hour he held them in rapt attention by a very able and eloquent address upon the advantages of farming.

Returning to the lower hall, we found a very choice display of fruits, vegetables, flowers, fancy articles and articles of practical utility; products of the dairy ; raw silk from China, and the same manufactured in American shops ; bread that might tempt the daintiest epicure, preserves, jellies, and domestic wines. There were some specimens of excellent cheese, both old and new. The display of butter was large, and of fair quality. The Hadley Farmers' Club contributed a large and choice collection of apples and pears, and several varieties of grapes. There were also good collections shown by other parties. The orchards of Ellwanger and Barry, of Rochester, New York, were represented by some thirty varieties of apples, seventy-five varieties of pears, and ten varieties of grapes. The large display of vegetables was what might be expected from the farms and gardens of the Connecticut Valley—the very best of their kind.

The ladies had done their full share in contributing to the useful and ornamental department of the show. The elegant knit counterpanes and the serviceable rag-carpets, the very nice homespun woollen yarn, the richly embossed needle-work, with all the other varieties of the department, were a sufficient guarantee that the useful and the beautiful were well appreciated by the matrons and maidens of this society.

The second day was devoted entirely to the horse. From the more general use of the horse for farm work, and the increased demand of the Federal government for this useful animal, it has become a necessity more than formerly to encourage the raising of good horses. While the fast young men have been sobered down by the exigencies of the times, I think we shall need good horses of all work more than horses of the fancy stock. I think it would be well to rear and cultivate a national breed, specially adapted to artillery and cavalry purposes. There was a great number of horses of all kinds on exhibition, which made the number of choice animals less in proportion.

There were 141 entries of horses of all kinds, viz., 9 of stallions, 31 of carriage horses, 34 of family horses, 3 of single draught horses, 5 of pairs of draught horses, 16 of travelling horses, 9 of breeding mares, 2 of colts of a year old, 10 of colts of two years old, 16 of colts of three years old, and one entry as a walking horse. Every part of this feature of the show was conducted with promptness and in excellent order, and every animal could be shown to advantage.

The main purpose of advancing the interests of agriculture,—to cultivate the arts and refinements of our rural homes and occupations, making thereby the pursuits of the farmer more attractive to the young of both sexes, has been fully accomplished in this exhibition.

There was a very large attendance during both days, and the remarkably good order preserved throughout the whole is a sufficient commendation to the efficient management of the officers of this society.

At two o'clock, members of the society, invited guests, and others, partook of a sumptuous dinner in the upper hall of the society's building. The festival was honored by his excellency, Governor Andrew, accompanied by the secretary of State and several members of the executive council. Speeches were made by his excellency, several of the council, and representatives of the press, adding dignity, grace and pleasure to the occasion.

I cannot close this report without my personal acknowledgment to the officers of the society, and especially to Mr. Stebbins, of Deerfield, and to Mr. Peck, of Northampton, for their courtesy and kindness.

ELIAS GROUT.

## HIGHLAND.

The Highland Society held its annual exhibition, at Middlefield, on the 10th and 11th of September.

The weather was in pleasing contrast with that of some former seasons at the time of exhibition, and indeed was all that the society's most ardent friends could desire.

As we ascended these literal "heights," we found the air balmy and exhilarating beyond comparison. Upon arriving at the entrance of the exhibition grounds we found the officers of the society busily engaged with their appropriate duties, yet, ready to receive and welcome their friends from abroad.

The exhibition was smaller this year than formerly; yet in the *quality* and *excellence* of the animals exhibited, compared favorably with those of previous years. It is but just to say that this comparatively youthful society stands among the first, if, indeed, it is not without a rival in the production of that important branch of farm husbandry, "neat stock."

We have said that the exhibition this year was limited in number. This argues no want of interest on the part of members, but rather was the unavoidable result of the unfavorable haying season; many farmers in that section having hardly completed their haying, and consequently had not taken the time necessary to gather their stock from the pasture, and make the usual arrangement for the show.

While this circumstance operated to prevent a full exhibition of cattle, it did not prevent the attendance, in person, of members and their families, and indeed of the whole people, to a very large extent. The attendance was never larger. On each morning the highways leading to the exhibition grounds were thronged with vehicles, laden with old and young, gathering to the scene of interest, to engage in the friendly greetings of this annual holiday. If no other good were derived from the operations of this society than relaxation from the ordinary pursuits of life, the social re-union of friends,—the mere addition of these to the calendar of the farmer's holidays; these alone would compensate for all the trouble and expense attendant upon its annual repetition.

One other feature connected with the exhibitions of the Highland Society, I cannot omit to notice, with pleasure. I refer to the meeting held in the society's hall on the evening of the first day of the exhibition. At an early hour the hall was filled with persons of both sexes, eager to listen to whatever might be said to create interest, or throw light upon that, which, for the time being, is the absorbing topic, agriculture, in some of its important bearings and relations.

This meeting was continued until 10 o'clock, and without any lack of interest, or an indication of weariness; and this, too, without the aid of professional men, and mainly by members of the society.

In short, I most cheerfully bear testimony that this society is quietly doing a good work, and much in its mode of operations is worthy of imitation by older societies.

P. STEDMAN.

## HAMPDEN EAST.

This society held its annual exhibition on the 13th and 14th days of October.

The grounds occupied and now owned by the society are near the centre of Palmer, and were formerly known as the "Trotting Park." They embrace a large tract of land finely situated and inclosed, and well adapted to its use. It affords ample room for ploughing and drawing matches, and a half-mile track, fitted in the best manner, for the show and trial of horses and for the exhibition of large teams of cattle. Well-arranged pens are provided for different classes of animals. They are easily approached, and afford good opportunity to view what they contain, but are hardly spacious enough for the number of animals confined in them on the present occasion. Nothing seems to be wanting now but the erection of a suitable hall,—for which, we understand, measures are already in train,—to render the place all that can be desired for a large agricultural exhibition.

But of the actual strength and prosperity of the society, except as these circumstances indicate it, we do not suppose a fair opportunity was afforded, on this occasion, to form a correct opinion. Circumstances, which affected more or less injuriously nearly all the agricultural exhibitions of the State, had, undoubtedly, a similar effect here. A large proportion of those who are accustomed to attend such exhibitions as visitors, if not as competitors, were necessarily absent. The scarcity and high price of labor, together with the peculiar character of the season, probably prevented such a display of the products of the soil, as might otherwise have been seen. Whether any deficiency in this respect was comparatively greater now than on former occasions, or greater here than elsewhere, we are unable to say. Judging from condensed reports of other exhibitions, to be seen in the public prints, we should suppose the deficiency was by no means greater here than elsewhere.

On the first day of the exhibition, the occasion seemed to have attracted little public attention, so small was the collection of people on the grounds. There was, however, a grand display of cattle, which would have been creditable to any society. These were chiefly grades, of Devon and Durham breeds. Among them were several fine herds of cows and heifers, all of like breed; bulls also, of pure blood, each having at its side a large number of its progeny, which showed, in many instances, the peculiarities of shape, color, and disposition of their sires. There was a large collection of well-trained working oxen; several weighty fat cattle, in fine condition; and a long string of town teams,—embracing, among others, twenty-two yokes from Monson and eleven from Brimfield, making a display not often to be surpassed.

Of sheep, we observed only a few. They were chiefly of the Leicester and South Down breeds. Among them were one or two superior animals.

Of swine, the collection was small, and in no way remarkable.

Of poultry, the display was respectable, both as to numbers and varieties. Attached to one coop, containing twelve common barn-yard hens, was this marvellous statement of their produce in a single year: "185 dozen eggs, besides several broods of chickens." From sale of eggs alone, there had been realized $33.30. And to this should be added sales of sundry pairs of chickens at a good price; while the net cost of grain consumed by the whole was but $7.80.

The fruits, vegetables, and grains, with the domestic and fancy articles, were exhibited in the vestry of the Congregational church. The display in each department, though each was limited in quantity, was of good quality.

The ploughing-match had been finished before our arrival in the morning. It brought out a good number of competitors, with ploughs of different patterns. The work appeared to have been well done,—pulverizing the soil, and leaving, in most cases, a sufficiently flat surface for planting. The work performed with a cylinder plough by Mr. Smith, of Greenfield, is worthy of special notice. We have had frequent occasions to observe the operation of this plough, and feel justified, therefore, both from observation and experience, in commending it as one of the most useful and valuable of all the implements of husbandry of this class.

On the second day, which had been announced as the time for the exhibition of horses and trial of their speed, the attendance of visitors was largely increased. Several fine horses were brought and exercised on the track early in the morning, foreshowing what might be expected in the exhibition. Being obliged, however, to leave the place before the time for the exhibition arrived, we are unable to say more of it than that, as it was afterwards reported by a disinterested and competent judge, it was creditable both to the society and the competitors.

In the afternoon, the annual address was delivered, on the grounds, by Rev. Dr. Vaill, of Palmer, who, it was said, gave great satisfaction to a large and attentive audience.

We are not acquainted with the constitution of this society, nor do we know what arrangements are usually made for the annual exhibition. We venture, however, to suggest here, as a matter of general utility, that there should be an early organization of committees, appointed to act as judges in the several departments, for the purpose and with the view of ascertaining where animals and articles of special worth are possessed, and of urging upon the owners of them the importance of contributing them to the fair. Much might be accomplished in this way by any suitable committee. Many things might be pledged beforehand to the show, which would add to its attractiveness and worth. For want of such an organization, committees—whose duty is limited to the day on which they are expected to serve—feel less interest in the matter, often fail to attend, or, if present, are disappointed and disheartened at the meagre display to be made in their special departments.

It also occurred to us, that, whenever the annual exhibitions of two societies are to be held in different places, within a short distance of each other and after a little interval of time, the whole surrounding community would be more benefited by an "union" exhibition in each place in its turn. At Hampden

East, we think the exhibition must have been affected, to some appreciable extent, by the just previous exhibition of the parent society at Springfield. And, in all like cases, it is plain that much may, and probably will, be wanting at one or other place, which would help to swell the magnitude, enhance the interest, and improve the character of the show. Separate organizations of the societies might still be retained for other purposes, and as general convenience would require. But the annual exhibitions might be transferred alternately from one society to the other, and both unite to form one large, attractive, and useful show.

This plan would save much of the present expense, and, at the same time, afford opportunity, by a conjoint offer of premiums, to increase the number and enlarge the value of them.

CHAS. C. SEWALL.

## FRANKLIN.

On the 24th of September last, according to appointment, I attended the cattle show and fair of the Franklin County Society at Greenfield, and have to report that although the exhibition of cattle was said by those present not equal to former years, yet it was in many respects a superior display of animals, larger in number and finer in quality, than often exhibited at county fairs.

There were but two town teams on the grounds. One of 20 pairs from Deerfield, and one of 27 from Shelburne. The Deerfield cattle were all four, five and six year olds, excepting two pairs of three year olds, and their entire weight was 79,755 pounds, average, 3,987. The Shelburne team which had several pairs of two and three year olds, weighed 80,615, average 2,908. In all there were 63 pairs of cattle, and the entire number of cattle was not far from 250. The entries were, thorough-bred bulls, 10; native, 2; thorough-bred cows, 6; dairy cows, 1; stock cows, 10, Ira Barnard, of Shelburne, exhibiting a pair of twin five year olds, one a pure red and the other a pure white; milch cows, 2; cattle for the stall, 7; working oxen, 14; heifers, 17; steer calves, 4, C. & L. B. Arms, of Conway, exhibiting twins;

heifer calves, 8; bull calves, thorough-bred, 2; miscellaneous stock, 14; steers, one and two years old, 18; three and four years, 15. Among the largest exhibitors of stock were, O. O. Bardwell, of Shelburne, who exhibited 28 head of cattle, 55 sheep and a boar; C. E. Williams, of Deerfield, 9 dairy cows; Isaac Barton, a herd of 11; William Long & Son, of Shelburne, 24; David L. Smith, of Colraine, a jack, pair of mules and a three months old mule; G. W. Carpenter & Son, of Shelburne, 12; Wilcox & Brothers, of Shelburne, E. W. Stebbins, Josiah Fogg, D. O. Fisk and others. Among the more noticeable cattle were the fat pairs of Samuel Fisk and George W. Carpenter, of Shelburne, the 3,980 pound four year olds of Jonathan McClellan, of Deerfield, the 3,800 pound four year olds of Edmund Skinner, of Shelburne, and the 2,700 pound yearlings of Stephen Fellows, of the same place.

Among the thorough-bred bulls was one owned and exhibited by E. W. Stebbins, Esq., of Deerfield, for size, fine points, and beautiful proportions, it would be hard to beat; also a full-blood Jersey bull and a heifer, which were very fine animals.

Of swine there were about 50 exhibited—several fine boars, and several fine litters of pigs. They were chiefly of the Chester County breed, introduced into the county a few years since by the former secretary of the society, James S. Grennell, Esq.

The exhibition of sheep was a large and splendid one. The number on exhibition was about 400, of South Down, Oxford, Norfolk, Dorset, Cheviot, Cotswold, New Leicester, Spanish Merino, and French varieties. The largest contributors were, Baxter E. Bardwell, O. O. Bardwell, D. O. Fisk, Oscar Bardwell, and Rufus L. Bishop, of Shelburne, Jonathan McClellan, of Deerfield, A. O. Buddington, of Leyden, Jonathan Smead, Pliny Martindale, Asa Howland, of Conway, Edwin H. Clapp, of Deerfield, Paul Jenkins, of Conway. Gardner Truesdale, of Shelburne, exhibited a Cotswold ram, (not a rebel,) weighing 203 pounds, and O. O. Bardwell, of the same place, a South Down one, weighing 175 pounds. D. O. Fisk, of Shelburne, who has some handsome crosses of South Down and Cotswold, has sold this season 54 grass-fed lambs out of his flock of 65, at $4.50 each.

By the liberality of James S. Grennell, Esq., a premium was offered for the largest flock of fine-wool sheep. There were five competitors for the premium: O. O. Bardwell exhibited 50; D. O. Fisk, 65; G. C. Dall, 47; B. E. Bardwell, of Shelburne, 125; J. McClellan, of Deerfield, 25. We were glad to see the farmers of Franklin turning their attention so much to sheep raising. It is, and will be for years to come, the most profitable stock raising that they can engage in. This county already stands foremost in the State in this department.

The exhibition of domestic manufactures, fancy articles, fruit and flowers, &c., was held in the town hall, and though not large, was very good indeed. The society's grounds are pleasantly located within a few minutes' walk of the public square, but as yet contains no building for the exhibition of domestic, fancy and mechanical articles. The first day of the fair was a most beautiful day as respects the weather. I regret that my business arrangements would not permit me to remain in attendance through the second day. I have never attended an exhibition which was so entirely free from intemperance and disorderly conduct, and I am happy to report the apparent success of the society.

In concluding, I cannot forbear to acknowledge the kindness and hospitality of James S. Grennell, Esq., one of the most influential and valuable members of the society.

HENRY COLT.

## HOUSATONIC.

The twenty-second annual exhibition of the Housatonic Agricultural Society, commenced on the 30th of September and continued three days. It was held at Great Barrington, on the ground belonging to the society, about one mile from the village. The show-ground comprises over thirty acres of the Housatonic interval, well fenced, with a very commodious building thereon, in which all articles for exhibition are placed, and affords ample room for at least three or four thousand people. Your delegate was on the ground during the first and second days, but is under the necessity of relying upon others for what transpired on the third.

I found this to be one of the most flourishing and prosperous societies in the Commonwealth. It contains eight hundred and thirty-five members, and is nearly free from debt.

The first day of the exhibition opened with a grand holiday, which all seemed to enjoy, from the president and executive committee to the infant in its mother's arms, (numbers of which were present.)

The inhabitants in the country round about had turned out in full force, or it *seemed* as if they were all there, to enjoy the festivities of the occasion. Each of the three days dawned beautifully, no cloud nor signs of rain to mar the enjoyment of those present, and each morning was clear and glorious as ever shone upon the face of nature. The weather was mild as summer. The beautiful mountains which surround this lovely valley presented their tinted leaves, and all nature seemed gay and cheerful.

There were ninety entries of horses, forty-three of working oxen and steers, forty-eight for cows and heifers, twelve for bulls and bull-calves, twenty-eight for sheep, eleven for swine, aud twenty-seven for poultry.

Cattle, like the inhabitants, were out in full force, representing the noble Shorthorn, the beautiful Ayrshire, the sleek Devon, and the wee little Jersey. Grade Shorthorns greatly predominated in numbers. Among them were several superior animals, and I cannot justly forbear to speak particularly of a yoke of four years old steers, presented by Luther H. Butler, of Lenox, which weighed 4,700 lbs., and also a yoke of six years old working cattle, which weighed 4,400 lbs. I. Wilcox, of Sheffield, exhibited a four years old pure bred Shorthorn bull, that attracted more attention than any other of this class on the ground. William Stanley, of Great Barrington, exhibited four Ayrshire heifers and a young bull, bred by H. H. Peters, of Southborough, all fine animals, and showed points of fine breeding. A. Gillman, exhibited the Devon bull Huron, bred by E. G. Fales, New York, which was much admired.

I am happy to say that the show of cattle was very superior in all its classes in that department of the fair. There were a large number of sheep and swine on exhibition, all of which did credit to their breeders and exhibitors.

The ploughing match was held on the society's ground, on the morning of the second day, there being thirteen entries of horses, and five for oxen. The work was decidedly better than that which I witnessed at several other fairs. It was so perfect, the committee found it difficult to decide the premiums. I can in no way do better justice to the ploughmen, than to quote from the report of the committee, who say: "We believe our ploughing matches have now reached the point, long the cherished object of the society. The great numbers in attendance attest the unabated interest of the public in the trials of these precursors of civilization. And doubtless *all* who gazed upon the straight furrows and rough surface made smooth by the strong arm and steady nerve of the sturdy tiller of the soil, uttered the silent prayer of gratitude to Him who has promised 'seed-time, and harvest,' that our beautiful grounds are not torn up by the tramp of armies, or ploughed with the messengers of death shot from the deadly cannon. Was there one present who did not breathe the silent petition that soon a wicked, causeless rebellion shall be crushed, peace return, and the sword beaten into ploughshares? Was there one who doubted such a result? Bid him gaze upon the ploughmen, and reflect, of such are our armies now in the field composed."

The third day was devoted expressly to the horse, which drew together a large crowd of spectators. The increased interest manifested in this branch of the stock department, and the superiority of the animals exhibited is highly gratifying to the society, and speaks well for its future success.

There was a greater quantity of butter and cheese in the hall than is often seen at a county fair, and the quality would not suffer in comparison with that of any other society in Massachusetts.

There were fewer agricultural implements there than we are accustomed to see at our county fairs.

Of fruits and flowers there were fine specimens, but not as large a collection as would have been shown in a fruit-bearing season.

Specimens of needle-work, drawing, and paintings were presented, much to the credit of the wives and daughters of the farmers of Southern Berkshire.

An able, interesting, and most valuable address was delivered by Sanford Howard, Esq., editor of the "Boston Cultivator," on practical agriculture, and was most earnestly listened to by at least two thousand people.

In conclusion, I must express my thanks to the officers of the society for their kind attention, and particularly to Mr. Bushnell, of Sheffield, the delegate from this society to this Board, for his hospitable and kind attention.

Paoli Lathrop.

## HOOSAC VALLEY.

The third annual fair and cattle show of the Hoosac Valley Agricultural Society was held on the 22d and 23d of September. The first day the weather was not very favorable; the equinoctial storm clearing off during the night before, it was followed by a cold, windy day, and the ground being very damp, made it quite unpleasant being out; so that the attendance was not large.

The whole number of entries of domestic animals was some twenty less than last year, though the quality in most cases good, and in some superior. There were a number of thorough-bred animals,—the Shorthorns taking the lead in numbers, with a few Devons. I noticed one very fine Ayrshire bull. Most of the stock exhibited showed the marks of the thorough-bred bulls very plainly, the grades being principally Shorthorns.

This society offers but one premium for thorough-bred bulls, and that without regard to breed. This I think an error, as there is not much, if any, more propriety in putting a thorough-bred Shorthorn and a thorough-bred Devon bull in the same class and bringing the two into comparison, than there would be in doing the same with a stallion and a jackass.

There was a good show of sheep; though not large in numbers, the quality was thought very fine by sheep fanciers, the long-wool predominating. The show of swine was small, but good in quality. Poultry was well represented.

The number of entries in the hall was considerably smaller than last year, but the articles exhibited did great credit to the exhibitors, and showed, both in the useful and fancy articles, that what the ladies of Hoosac Valley do, they do well.

The second day was not as windy and uncomfortable as the first, and the attendance was quite large. Indeed, the whole population of Northern Berkshire seemed to have made it a holiday.

Of horses, there were seventy-one entries, and among them many fine animals, many of them showing excellent points for strength, and especially for endurance, or, to use a horseman's phrase, for bottom.

Not being able to remain through the afternoon, I can give no account of the society's dinner, nor the address by the Hon. Henry L. Dawes, nor of the trial of speed by the horses; all of which may help to keep up an interest in, but ought not to be essential to, the life and prosperity of an *agricultural* society.

This society seems to be in a prosperous condition. With ample grounds, a good hall, and well managed, its receipts for the two days were $850, or $50 more than last year.

My acknowledgments are due to the officers of the society, and especially Mr. Johnson, of North Adams, for kind attentions during my stay in their pleasant village.

SHERMAN CONVERSE.

## BRISTOL.

The fortieth annual exhibition of the Bristol County Agricultural Society was held at Taunton, October 6th, 7th, and 8th, and your delegate was on the grounds the morning of the 6th. The grounds of this society lie some mile and a half or two miles from the town, and are beautifully adapted to the purposes for which they are now used. The first thing attracting attention, after entering the gates, is the fine clump of trees which skirt this side of the grounds, making a cool and pleasant shade.

After a short walk we find ourselves in full and close view of the magnificent hall, just finished at an expense of $11,500, and now occupied in a finished state for the first time. It is a three-story building, 150 feet long, by 100 feet wide. The basement story being of stone, and containing a large dining-room, secretary's office, and a large exhibition room for heavy articles.

On the second story was exhibited the domestic and mechanical manufactures, with fruits, flowers, and vegetables.

The third story contains a vast hall, where the different addresses were delivered, and meetings of the society daily holden, and which is to be kept for the use of the town. It is substantially built and painted,—the grounds well graded around it; and it must ever remain a monument to the untiring energy of the officers of the society, as well as to the liberality of its members.

The morning of the 6th being pleasant, people early flocked to the grounds, where the first thing to attract attention, as per programme, was the ploughing match, which was spiritedly contested by 15 different teams, all of which used the double Michigan plough, and generally did their work well. After the ploughing, two town teams, consisting of 84 yoke of oxen, preceded by the Taunton brass band, marched around the track, making a fine appearance, and attracting much attention from the spectators.

The show of stock was not extra, with the exception of that exhibited by the State Lunatic Hospital, which occupied ten stalls, containing the thorough-bred bull Mohican, weighing 2,600 pounds, also a pair of fat oxen and a steer, and some fine cows. I noticed also a large pair of fat oxen exhibited by F. B. Dean, and a fine pair of working oxen, weighing 4,490 pounds, by Seth H. Britton, which showed good training, as did many other pair of working oxen.

Sheep were not plenty; noticed some fine specimens of South Downs. Swine, in numbers not great, but in points of excellence, fine.

Poultry were out in full numbers and plumage, and the most fastidious could here find their favorites.

On the second day, the horse was king, and had full sway. With the exception of family horses, the show was small. The fast horses were here in small numbers, but made up in speed what they lacked in that respect. Family horses were very fine and the show very large. I saw not colts of any age which led me to think the fine horses I saw were not raised in the county, but were productions of other counties or States.

At 1½ o'clock, P. M., the crowd of people made their way to the hall, where they listened to a very spirited dedicatory address from the Rev. A. L. Stone, of Boston, followed by a poem from Hon. William M. Rodman, of Providence, which ended the exercises for the second day. The exhibition in the hall was very fine indeed, including piles upon piles of apples and pears, the latter numbering its varieties by the hundred, some of which I never saw excelled. Grapes were shown in abundance, both in and out-door varieties.

Vegetables were numerous and fair in quality.

Flowers in abundance and very fine.

The display of domestic manufactures was very large, and uncommonly beautiful, being exhibited in separate articles, and in some instances by whole cases and tables. Bristol County may justly pride herself upon this department of her show.

In heavy manufactures the show was very full and fine. Among them we noticed a splendid case of plated ware from the manufactory of Reed & Barton; 302 varieties of tacks from A. Fields & Sons; a very handsome display of furniture from S. Washburn & Son.

The case of stuffed birds, exhibited by Charles L. Blood, attracted much attention. The table of William Mason was very attractive, and by its extent showed that the owner had an interest not only in his extensive manufactory, but also in the farm and garden. There I saw the heavy parts of machinery—the musket with its polished barrel and bayonet—the fine grapes, both in and out-door varieties—rare plants, apples, pears, plums, and an extensive assortment of field and garden vegetables. This table excelled in all of its departments, and was a sight to behold, being nearly the whole length of the hall, and full to overflowing throughout its entire length. New patterns of churns, ploughs, buckets, stoves, and various other things were there in too numerous a number for me to examine, much less to mention.

On the morning of the third day rain was falling and the roads heavy, which caused people to keep in doors, and necessarily the attendance was small, and confined mostly to members of the society, who were collected in the hall where the premiums were read, and where at 1 o'clock, P. M., the annual dinner was partaken of, after which followed an eloquent address from

Hon. A. H. Bullock, of Worcester, and speaking from various other persons, which took up the day, and contributed as much to the profit of the members as if the sun had shone in all its glory.

This is the history, and thus ended the Bristol County cattle show for 1863, and when we look at the thousands in attendance,—the stock shown, and most of all the beautiful display in the hall, it must be called a decided success for the society.

EDWARD W. STEBBINS.

## PLYMOUTH.

Having been authorized, by vote of the Board, to visit the annual exhibition of the Plymouth County Agricultural Society, holden at Bridgewater the first and second days of October, 1863, to my regret, owing to circumstances which I could not control, the first day's show was lost to me.

Arriving at Bridgewater on the evening of the first, I was enabled to repair to the grounds of the society early on the morning of the second day; and, there being considerable mist afloat and much wet on the grass, I at once entered the spacious building and commenced an examination of articles on exhibition. Fruit, vegetables and flowers were not abundant, though there were some good specimens of each.

P. Lincoln Cushing, of Middleborough, showed thirty-three varieties of pears, and G. Gilbert, of Plymouth, twenty-eight, a moiety of which appeared well,—some very well. Willard Billings, of West Bridgewater, twenty-eight sorts of apples; and there were several smaller parcels, but owing to climatic, or other causes, but few of them could be ranked as fine specimens. Grapes showed to better advantage; Black Hamburg, Delaware, Concord, Diana and Isabella were fine. The cranberry show was excellent; those presented by William F. Hill, of Bridgewater, were remarkably well-ripened, but the circumstances of their being thus I was unable to learn. Two lots of cut flowers, in variety, evinced care and foresight on the part of the exhibitors; so fresh and beautiful were they in foliage and blossoms, that I think they had not missed the parent stem. Of butter and cheese there were many boxes and tubs which looked well, and if my olfactories were in tune I should pronounce *good*.

Here let me remark, that at exhibitions of this kind, those articles are very improperly treated. It seems to me that *visitors*, to say the least, act inconsiderately when thrusting a thumb-nail into a lump of butter, or slicing off cheese with an old jackknife, especially ill-mannered is it if said jackknife has been long used in replenishing a filthy tobacco pipe. Let the appropriate committees examine bread, butter and cheese, and others let those articles alone, except optically, unless invited to do otherwise by those having rightful authority. Among the machines and tools, I noticed two which appeared to be small affairs, but, on witnessing the operation of each, found them to be really useful; one an eyeleting, and the other a machine for leathering tacks, each doing its work well. The former, by Reed & Howard, West Bridgewater, the latter by L. G. Bradford, of Plymouth. Some space in the room was occupied by fancy articles, needle-work, etc., which was well wrought, comparing favorably with other shows of the kind which I have witnessed.

Outside, the exhibition extended over much territory, no portion of which lacked space for the free circulation of air. A goodly number of colts were shown; several fine ones, among which was one that I regarded as a little *extra;* a Morgan, seventeen months old, and owned by Darius White, of Plympton. In the cattle pens, many of which were empty, the more noticeable were five cows, two calves and a large and fine heifer, twenty-one months old, all Jerseys, and the property of Charles G. Davis, Esq., of Plymouth, president of the society. Fat cattle were scarce. No working oxen on the ground. On viewing the ground that was ploughed the day before, it was apparent that ten teams had been employed, but whether all were oxen I did not learn. The furrows were well turned, but believing they were not cut deep enough, made inquiry in relation thereto, and was informed that the subsoil was of such a nature as not to admit to plough deeper,—a fact that was not apparent to a casual observer. Deep ploughing is my rule; say from seven to ten inches. If the subsoil is filled with rocks, why, of course the rule may not be conformed to strictly;

or, if ploughing among fruit trees, three inches is deep enough, unless so far away that the danger of mangling roots is removed.

I believe no pigs or porkers were to be seen. Among the several cages of domestic fowls, a pair of bronze turkeys, weighing thirty-seven pounds, accompanied by six young ones, three months old, were more attractive. They were truly noble-looking birds.

There was some trotting on the "track," and for ought I know,—never having taken much interest in that branch of industry,—was all the interested parties anticipated. If some of the "trotters" failed to come up to the standard of "2.40" in making time, I can assure you they were few minutes more in "getting round."

In rambling over the grounds amongst the crowd of spectators, my ears were occasionally saluted with criticisms of this sort: "These cattle are nothing to brag of;" "I could have driven down a better cow than I have seen here;" "I've a colt at home that beats any thing on the premises." Now it may be all true, but I take the liberty to doubt the truthfulness of those assertions. It is generally understood, I think, that some persons are so full of conceit, that they vainly imagine that what *they* possess, is, of course, nicer than can be found elsewhere. Others are so addicted to grumbling and fault-finding that nothing better can be expected of them. Let those two classes of people take their fine animals and articles out where others can examine them, or hold their peace while in a crowd.

At one o'clock, dined in the large hall; the tables, in which were all surrounded by ladies and gentlemen, who seemed to discuss the dinner with vigor. Stomachs replenished, the president made some appropriate remarks, and then introduced the orator of the day, Hon. A. H. Bullock, of Worcester. In his address the speaker maintained that all persons engaged in any honorable calling, had an equal claim to the title of working people; and so vigorously, forcibly and eloquently did he discuss the subject, that we all decided to yield him the palm as being the best Bullock on the ground, or in the State.

Asa Clement.

## NANTUCKET.

In consequence of sickness, Mr. Bushnell could not attend the exhibition of the Nantucket County Agricultural Society, and failing to secure the attendance of another member of the Board in time, I offer the following report of the eighth exhibition of that society:—

The weather being very fine, farmers and others came, in larger numbers than usual, bringing stock, vegetables, butter, fruits, flowers, fancy articles, and manufactures of handiwork. At the grounds had been erected a large number of stanchions, by which fifty-nine milch cows were secured. The advantage of this arrangement is that all the points of an animal can be seen at once, thereby avoiding the usual trouble that committees have, in going from pen to pen to compare the merits of one with another. Many of the cows were a cross of common stock with the Ayrshire, showing a decided improvement since the society was formed. There were many one and two year olds of a like character. A number of fine-looking bulls were there of mixed blood, and some received premiums; but the society has discontinued offering premiums in future to any but thorough-bred Ayrshire. Working oxen were few in number, as horses are preferred.

The exhibition of sheep was large, showing a mixture of the common sheep with the South Down and Cotswold; one yearling ram (South Down cross) producing a fleece of over nine pounds, and one of the Cotswold yearlings seven and a half pounds. The farmers are entering into the spirit of sheep-raising, and may, in future, come near what it was some years ago.

The number of swine was small, but of good stock, and added much to the exhibition in their holiday cleanliness.

Poultry were well represented, (better, in fact, than usual,) —the Black Spanish taking the lead.

At nine o'clock of the second day, the examination of horses came off. Among the breeding stock were some fine mares, with colts sired by a stallion from State of Maine, named "Rising Sun." A growing interest is observable in this department, since breeders can bring their stock to the exhibitions. Several fine family horses were driven around the track, showing good action and some speed.

The ploughing match came off at two o'clock. Only three teams entered—two horse and one ox team. The land was struck out and well ploughed by each competitor.

At the hall, in the centre of the town, was as fine a collection of vegetables as could be found in any county. The butter was excellent, and did credit to the ladies that are always ready to assist at the exhibitions. Fruit culture has not been attended to until a few years past. There were several well-known sorts of apples, that compared favorably with those brought from other counties. About fifty sorts of pears; some leading varieties were very fine. The increase in pear-raising is five hundred per cent. since the society's first exhibition. Greenhouse grapes were excellent. Several of the best native grapes were well ripened. Lawton blackberries, in perfection, were seen at this late season. Flowers were handsomely arranged, showing many new and rare sorts.

Fancy articles and handiwork of domestic manufacture were less than usual, owing to the ladies and misses having devoted much time in aid of the soldiers, instead of this department.

Until within a few years, a large proportion of the vegetables used in this county have been brought to the island, where now enough is raised to supply all demands; and so also of the hay crop. There are thousands of acres of swamp lands, that can be made to produce cranberries or made into good hay-meadows, that the society has now offered premiums for reclaiming.

In conclusion, I would say, that in every department there appears a harmony and interest of all parties to make the two days of the annual exhibition the grand gala days of the year; and where such feelings are cultivated, a larger interest must grow out of them to further increase the usefulness of the society.

James Thompson.

## MARTHA'S VINEYARD.

The sixth annual cattle-show and fair of the Martha's Vineyard Agricultural Society, was held on the fair-grounds, at West Tisbury, on Tuesday and Wednesday, the 20th and 21st days of October.

The weather was delightful on both days; but, in consequence of the steamer running to the island being chartered for government use and a packet run in its place, I did not reach the fair-grounds till the second day; consequently I had not the pleasure, very much to my disappointment, of witnessing the show of cattle.

Wednesday morning was most delightful. On my arrival upon the grounds I found a large assemblage of anxious spectators, vieing with each other to make this, what it really was, the farmer's holiday.

After an introduction to the officers of the society, I mingled with the crowd who were discussing the merits and demerits of the different classes of stock exhibited on the first day. All were pleased with the show, and pronounced it the *best* they had ever held.

And I was happy to learn that the society had taken measures to improve the stock upon the island, by purchasing six thorough-bred Ayrshire bulls; a blood of stock, I think, well adapted to that locality. And I shall look forward, with fond anticipations of seeing fine herds of Ayrshire stock raised on the island, which will reflect great credit upon that young and enterprising society. In connection with the horned cattle, was the increased interest in sheep-raising and wool-growing.

Not only the farmers, but the farmers' wives, were deeply interested in the subject of wool-growing. And, in my opinion, there is not any branch of farming that will pay better, and improve their plain lands faster, than stocking them with sheep. And I hope yet to see those almost barren plains converted into rich and luxuriant fields.

Of sheep there were twelve entries, more than some of our older and larger societies can report.

The show of horses was respectable, though not large.

Entries of all classes and ages were eighteen.

Of the swine I have nothing to say. Entry, one.

The ploughing match was well attended; the ploughman displaying a good degree of skill in holding the plough, also in managing his team.

And here I take the liberty to recommend to the farmers of the island, the use of the "swivel plough," manufactured by the Messrs. Ames, of Boston.

I consider it *the* plough of all others for the farmer to use.

And here I will recommend to the farmers of Dukes County to shelter their sheep from the cold and bleak winds of winter, and the damp and chilly atmosphere, which will greatly reduce the quantity of feed requisite for them, also increase the quality and quantity of wool, as well as make the ewes healthier and stronger in bringing forth their offspring.

The society's large and commodious hall was well filled and handsomely decorated with the handiwork of the ladies of the island.

The tables were loaded with every conceivable variety of fruits, flowers and vegetables common on such occasions; also grains, such as wheat, rye, oats and corn, of superior quality.

Bread, butter, cheese, cake, wines and jellies of unsurpassed excellence; which shows what a prize a young farmer can obtain by going to the island.

The fruit, as a whole, was the best I have seen this year. Apples, though not abundant, were very fine. Pears, several varieties, large and fine also. Quinces and grapes were of surpassing excellence. Peaches, the first and only ones I have seen grown in the State, were beautiful. Cranberries, the like of which, for size and beauty, I never saw. All of which is conclusive evidence that the soil and climate of the island is pecuiarly well adapted to the cultivation of most kinds of fruit, and especially so to pears, quinces, peaches, grapes and cranberries.

In the floral department there was a great variety, of both natural and artificial; well arranged and of most exquisite beauty.

The most attractive feature in the hall was the rich and varied specimens of shell-work, comprising monuments, grottos, picture frames, with and without pictures; vases and vases of flowers, of most extraordinary beauty. It excited the wonder and admiration of all present. The ladies of Dukes County are not to be outdone, in their department, by any society in the State. And they are entitled to great credit and a meed of praise, for their untiring labors to make, as they did, a magnificent display of industry and skill in their works of art. There was, also, some beautiful specimens of painting, of which I cannot particularize.

But what was most pleasing to the eyes of your delegate, was some beautiful specimens of tobacco, of this year's growth, manufactured into cigars for smoking, and plug for chewing. It was quite equal, in fineness and flavor, to the best Spanish leaf. It was raised by the society's very worthy and enterprising delegate to this Board, Dr. Cleaveland.

After feasting the eye on the rich and varied things in the hall, a large number sat down to a good and substantial dinner, which satisfied the wants of the inner man ; after which a large number of farmers, with their wives and daughters, repaired to the upper hall, and held an interesting and I hope a profitable discussion upon farms, farm stock and farming generally.

I was highly pleased to see the interest taken in the cause of agriculture by the ladies. And with the encouragement of this Board, I flatter myself that I shall yet see this society, though small, one of the most prosperous and flourishing societies in this Commonwealth.

After closing the discussion on farming, we returned to the lower hall, where we were feasted with cake and wines of excellent quality and most delicious flavor.

Many thanks are due the secretary and others, officers and members of the society, for their unwearied pains taken to make my visit pleasant and agreeable, during my brief stay with them.

M. Stebbins.

# APPENDIX.

# RETURNS OF AGRICULTURAL SOCIETIES FOR 1863.

## *Finances.*

| SOCIETIES. | Amount received from the Commonwealth. | Income of the permanent fund. | New members and donations. | All other sources. | Receipts for the year. | Premiums offered. | Premiums and gratuities paid. | Current expenses —not including premiums and gratuities — for the year. | Disbursements for the year. | Indebtedness. | Value of real estate. | Value of personal property. | Permanent fund. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Massachusetts, . . | - | $2,500 00 | - | - | $2,500 00 | - | $225 00 | $110 00 | - | - | - | $40,000 00 | $40,000 00 |
| Essex, . . . . . | $600 00 | 488 32 | $126 00 | $488 32 | 1,702 64 | $1,498 00 | 638 25 | 884 93 | $1,902 16 | - | $6,000 00 | 1,900 00 | 7,600 00 |
| Middlesex, . . . . | 600 00 | 82 00 | 97 00 | 515 62 | 1,294 62 | 862 00 | 607 75 | 644 49 | 1,190 49 | - | 3,000 00 | 1,741 00 | 4,741 00 |
| Middlesex North, . . | 600 00 | - | 82 00 | 2,401 59 | 3,311 92 | 883 00 | 316 00 | 692 62 | 2,751 41 | $500 00 | 6,614 94 | 665 69 | 6,780 63 |
| Middlesex South, . . | 600 00 | 24 00 | 47 00 | 851 00 | 1,522 00 | 993 00 | 423 30 | 1,006 00 | 1,429 30 | 2,713 55 | 7,200 00 | 1,500 00 | 8,700 00 |
| Worcester, . . . . | 600 00 | - | 150 00 | 2,057 22 | 2,807 22 | 1,263 50 | 604 18 | 1,562 16 | 2,668 41 | 5,500 00 | 18,000 00 | 600 00 | 12,500 00 |
| Worcester West, . . | 600 00 | 296 92 | 33 00 | 189 85 | 1,119 77 | 874 00 | 529 50 | 215 72 | 745 22 | 350 00 | - | 5,087 70 | 5,087 70 |
| Worcester North, . . | 600 00 | 323 15 | 205 00 | 387 80 | 1,515 95 | 1,165 75 | 740 92 | 452 39 | 1,193 31 | - | - | 5,161 95 | 4,961 95 |
| Worcester South, . . | 600 00 | 217 40 | 74 00 | 82 50 | 973 90 | 685 50 | 410 83 | 242 22 | 616 22 | - | 2,300 00 | 1,655 00 | 3,955 00 |
| Worcester South-East, | 600 00 | 98 13 | 126 00 | 632 07 | 1,456 20 | 988 00 | 539 71 | 533 95 | 1,073 66 | 89 22 | - | 3,519 33 | 3,519 33 |
| Hampshire, Franklin and Hampden, | 600 00 | 240 00 | 208 00 | 1,126 36 | 2,174 36 | 863 25 | 589 75 | 823 62 | 1,675 12 | 3,400 00 | 7,450 00 | 4,000 00 | 9,250 00 |
| Hampshire, . . . . | 600 00 | 576 17 | 60 25 | 356 89 | 1,593 31 | 654 75 | 408 71 | 1,047 43 | 1,455 94 | - | 4,456 67 | 364 88 | 4,821 55 |
| Highland, . . . . | 600 00 | 78 50 | 64 00 | 263 85 | 1,006 35 | 600 50 | 402 62 | 205 12 | 607 74 | - | 2,000 00 | 1,840 00 | 3,840 00 |
| Hampden, . . . . | 600 00 | - | 105 50 | 3,528 36 | 4,233 86 | 1,874 25 | 1,282 99 | 2,907 80 | 4,190 79 | 9,400 00 | 32,150 00 | 800 00 | 40,750 00 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hampden East, . . | 558 00 | 193 22 | 104 50 | 163 00 | 1,018 72 | 718 85 | 418 40 | 102 80 | 811 50 | 1,200 00 | 3,500 00 | 941 00 | 3,241 00 |
| Franklin, . . . . | 600 00 | 509 40 | 564 50 | - | 1,673 90 | 812 25 | 524 38 | 555 91 | 1,501 72 | 1,000 00 | 7,500 00 | 100 00 | 6,000 00 |
| Berkshire, . . . . | 1,200 00 | 400 00 | 190 00 | 1,907 47 | 3,697 47 | 1,462 00 | 1,391 00 | 880 25 | 4,311 25 | 300 00 | 12,000 00 | 500 00 | 12,500 00 |
| Housatonic, . . . | 600 00 | 673 50 | 58 00 | 1,929 35 | 2,460 85 | 789 00 | 787 00 | 1,393 40 | 2,180 40 | 2,000 00 | 8,000 00 | 150 00 | 14,166 00 |
| Hoosac Valley, . . | 520 00 | 53 50 | 185 00 | 765 00 | 1,523 50 | 690 00 | 518 75 | 410 66 | 1,735 72 | 2,100 00 | 5,200 00 | 25 00 | 3,100 00 |
| Norfolk, . . . . . | 600 00 | - | 92 00 | 1,699 91 | 2,391 91 | 1,787 00 | 439 88 | 2,311 79 | 2,750 87 | 6,650 00 | 10,414 00 | - | 10,414 00 |
| Bristol, . . . . . | 600 00 | - | 4,914 00 | 3,110 77 | 8,024 77 | 1,389 00 | 1,016 50 | 2,847 77 | 3,863 77 | 9,000 00 | 22,146 00 | 800 00 | 13,946 00 |
| Plymouth, . . . . | 600 00 | 473 80 | 158 00 | 2,531 38 | 3,721 43 | 1,421 50 | 1,105 29 | 812 70 | 2,891 45 | 2,421 40 | 18,500 00 | 1,829 98 | 19,500 00 |
| Barnstable, . . . . | 600 00 | - | 35 00 | 514 80 | 1,149 80 | 712 00 | 405 60 | 379 02 | 784 62 | 400 00 | 6,000 00 | 400 00 | 6,400 00 |
| Nantucket, . . . . | 494 53 | 273 99 | 22 50 | 268 85 | 1,035 42 | 688 25 | 265 75 | 547 17 | 881 61 | - | 2,500 00 | 1,000 95 | 2,600 00 |
| Martha's Vineyard, . | 600 00 | 488 28 | 160 33 | 732 33 | 1,980 94 | 652 00 | - | 407 06 | 1,633 17 | 1 118 40 | 3,440 93 | 2,433 33 | 5,924 27 |
| Totals, . . . . . | $14,772 53 | $7,990 28 | $7,761 58 | $21,500 28 | $54,890 81 | $24,324 45 | $14,589 06 | $21,976 98 | $44,845 85 | $47,142 57 | $189,572 54 | $77,015 81 | $254,318 43 |

## *Permanent Fund—How Invested.*

MASSACHUSETTS.—In bank stocks, policies of Massachusetts Life Office, Shattuck legacy.
ESSEX.—In bank stocks, notes and railroad bonds.
MIDDLESEX.—In notes secured by mortgages, bank and railroad stock.
MIDDLESEX NORTH.—In real estate.
MIDDLESEX SOUTH.—In buildings, &c., and notes receivable.
WORCESTER.—In real estate.
WORCESTER WEST.—In U S. notes, notes against responsible parties, fixtures, &c.
WORCESTER NORTH.—In bank stock, U. S. bond, notes of hand, fixtures, &c.
WORCESTER SOUTH.—In hall, furniture, cattle pens, &c.
WORCESTER SOUTH-EAST.—In promissory notes, pens and furniture.
HAMPSHIRE, FRANKLIN AND HAMPDEN.—In notes secured by mortgage.
HAMPSHIRE.—In real estate, life members' notes, cattle pens, &c.
HIGHLAND.—In real estate, U. S. Notes, mortages and loans.
HAMPDEN.—In land, buildings, &c.
HAMPDEN EAST.—In loans, real estate, fixtures, &c.
FRANKLIN.—In real estate.
BERKSHIRE.—In real estate.
HOUSATONIC.—In real estate, notes, &c.
HOOSAC VALLEY.—In real estate.
NORFOLK.—In real estate occupied by the Society.
BRISTOL.—In farm, buildings and fixtures.
PLYMOUTH.—In real estate and furniture.
BARNSTABLE.—In land and buildings.
NANTUCKET.—In real estate, U. S. bond, and notes.
MARTHA'S VINEYARD.—In land, hall, fixtures, personal notes, &c.

## ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED.

### *For Farms, Farm Improvements, Manures, &c.*

| SOCIETIES. | For management of farms. | For draining. | For subsoiling. | For ploughing at the Exhibition. | For reclaiming swamp lands. | For experiments with manures. | For spading. | For hedges and ornamental trees. | For reclaiming old pastures. | For orchards of all kinds. | For cranberries. | For other farm improvements. | Total amount offered for farm improvements. | Total am't awarded for farm improvements. | Total amount actually paid for farm improvements. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Massachusetts, | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Essex, | – | – | – | $82 00 | – | $15 00 | – | – | $10 00 | – | – | – | $194 00 | $107 00 | $102 00 |
| Middlesex, | $25 00 | – | – | 39 00 | – | – | – | – | – | – | – | – | 239 00 | 64 00 | 64 00 |
| Middlesex North, | – | – | – | 18 00 | – | – | – | – | – | – | – | – | 90 00 | 18 00 | 15 00 |
| Middlesex South, | – | – | – | 38 00 | $10 00 | – | – | – | – | $26 00 | – | $40 00 | 309 00 | 114 00 | 114 00 |
| Worcester, | – | – | – | 60 00 | – | – | – | – | – | – | – | – | 92 00 | 60 00 | 46 75 |
| Worcester West, | – | – | – | 40 00 | – | – | – | – | – | – | – | – | 190 00 | 40 00 | 33 00 |
| Worcester North, | – | – | – | 48 00 | – | – | – | – | – | – | – | – | 255 00 | 48 00 | 48 00 |
| Worcester South, | – | – | – | 29 00 | – | – | – | – | – | – | $4 00 | – | 106 25 | 33 00 | 33 00 |
| Worcester South-East, | – | – | – | 52 00 | – | 15 00 | – | – | – | – | 2 00 | – | 148 00 | 69 00 | 64 00 |
| Hampshire, Franklin & Hampden, | – | – | – | – | – | – | – | – | – | – | 5 00 | – | 20 00 | – | – |
| Hampshire, | – | – | – | – | – | – | – | – | 6 00 | – | – | – | 146 25 | 6 00 | 6 00 |
| Highland, | 8 00 | – | – | – | 5 00 | 20 00 | – | – | – | 6 00 | – | – | 78 00 | 39 00 | 39 00 |
| Hampden, | – | – | – | 26 00 | – | – | – | – | – | 12 00 | – | – | 309 00 | 38 00 | 24 00 |
| Hampden East, | – | – | – | 16 00 | – | 8 00 | – | – | – | – | 75 | – | 114 00 | 24 75 | 24 75 |
| Franklin, | – | – | – | – | – | – | – | – | 10 00 | – | – | – | 36 00 | 10 00 | 10 00 |
| Berkshire, | – | – | – | 48 00 | 10 00 | 25 00 | – | – | – | 14 00 | – | – | 106 00 | 97 00 | 97 00 |
| Housatonic, | – | – | – | 47 00 | 20 00 | – | – | – | – | – | 1 00 | – | 30 00 | 20 00 | 20 00 |
| Hoosac Valley, | – | – | – | – | – | 25 00 | – | $2 00 | 6 00 | 16 00 | – | – | 53 00 | 49 00 | 49 00 |
| Norfolk, | – | – | – | 56 00 | – | – | $15 00 | – | – | – | 3 00 | – | 586 00 | 74 00 | 73 00 |
| Bristol, | – | – | – | 66 00 | – | – | – | 7 00 | – | 45 00 | 30 00 | – | 355 00 | 148 00 | 148 00 |
| Plymouth, | 95 00 | – | – | 35 00 | – | 45 00 | – | – | – | – | 30 00 | – | 325 00 | 205 00 | 70 00 |
| Barnstable, | – | – | – | 11 00 | – | 13 00 | – | – | 5 00 | 8 00 | 4 00 | – | 66 00 | 41 00 | 41 00 |
| Nantucket, | – | – | – | 9 00 | – | – | – | – | – | – | 4 00 | – | 51 00 | 13 00 | 13 00 |
| Martha's Vineyard, | – | – | – | 12 00 | – | 4 00 | 3 00 | – | – | 6 00 | 9 00 | – | 86 00 | 34 00 | * |
| Totals, | $128 00 | – | – | $732 00 | $45 00 | $170 00 | $18 00 | $9 00 | $37 00 | $133 00 | $92 75 | $40 00 | $4,054 50 | $1,351 75 | $1,134 50 |

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* Paid after January 1, 1864.

## *For Farm Stock.*

| SOCIETIES. | For Bulls. | For Milch Cows. | For Heifers. | For Calves. | For Working Oxen. | For Steers. | For Fat Cattle. | For Horses. | For Sheep. | For Swine. | For Poultry. | All other Stock. | Total amount offered for Live Stock. | Total am't awarded for Live Stock. | Total amount paid out for Live Stock. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Massachusetts, | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Essex, | $18 00 | $12 00 | $41 00 | $8 00 | $36 00 | $14 00 | $23 00 | $61 00 | $15 00 | $24 00 | $15 00 | – | $348 00 | $267 00 | $254 00 |
| Middlesex, | 20 00 | 36 00 | 17 00 | 5 00 | 18 00 | 4 00 | 10 00 | 86 00 | 5 00 | 27 00 | 17 00 | $70 00 | 352 00 | 315 00 | 315 00 |
| Middlesex North, | 37 00 | 51 00 | 24 00 | – | 28 00 | 17 00 | 8 00 | 52 00 | 11 50 | 14 00 | 14 00 | 20 00 | 395 00 | 276 50 | 215 50 |
| Middlesex South, | 26 00 | 17 00 | 11 00 | 10 00 | 10 00 | 4 00 | 10 00 | 53 00 | 14 00 | 22 00 | 19 00 | – | 313 00 | 196 00 | 188 50 |
| Worcester, | 12 00 | 25 00 | 23 00 | 11 00 | 38 00 | 46 00 | 20 00 | 292 00 | 24 00 | 20 00 | 9 00 | 142 00 | 763 00 | 662 00 | 409 13 |
| Worcester West, | 25 00 | 40 00 | 16 00 | 15 00 | 35 00 | 26 00 | 47 00 | 61 00 | 10 00 | 34 00 | 6 00 | 43 00 | 423 00 | 355 00 | 370 50 |
| Worcester North, | 37 00 | 33 00 | 24 00 | 35 00 | 20 00 | 37 00 | 27 00 | 101 00 | 25 00 | 23 00 | 13 00 | 40 50 | 447 50 | 415 50 | 397 50 |
| Worcester South, | 21 00 | 15 00 | 8 00 | 5 50 | 26 00 | 17 00 | 9 00 | 35 00 | 13 00 | 24 00 | 7 50 | 46 00 | 333 00 | 332 50 | 214 50 |
| Worcester South-East, | 24 00 | 30 00 | 80 00 | 12 00 | 28 00 | 17 00 | 3 00 | 78 00 | 6 00 | 36 00 | 4 50 | – | 294 50 | 268 50 | 259 00 |
| Hampshire, Franklin & Hampden, | 40 00 | 14 00 | 16 00 | 16 00 | 53 00 | 15 50 | 45 00 | 189 00 | 18 00 | 13 00 | 2 00 | 143 50 | 498 00 | 565 00 | 437 50 |
| Hampshire, | 18 00 | 9 00 | 6 00 | 7 00 | 39 00 | 15 50 | 17 00 | 172 00 | 15 00 | 6 00 | 8 00 | – | 396 00 | 312 50 | 238 50 |
| Highland, | 15 00 | 5 00 | 12 50 | 1 00 | 23 00 | 11 25 | 9 00 | 102 00 | 22 50 | 3 00 | 2 12 | 18 00 | 356 25 | 224 37 | 224 37 |
| Hampden, | 41 00 | 46 00 | 15 00 | 13 00 | 27 00 | 36 00 | 80 00 | 907 00 | 32 00 | 17 00 | 11 50 | 94 50 | 1,330 00 | 1,301 00 | 1,125 00 |
| Hampden East, | 35 00 | 12 00 | 9 00 | 9 00 | 25 00 | 10 00 | 11 00 | 65 00 | 26 00 | 19 00 | 8 00 | 24 00 | 292 50 | 253 00 | 253 00 |
| Franklin, | 25 00 | 31 40 | 14 40 | 15 40 | 19 20 | 48 60 | 18 20 | 105 80 | 46 40 | 17 80 | 2 00 | 58 00 | 488 50 | 402 20 | 354 60 |
| Berkshire, | 54 00 | 60 00 | 30 00 | 12 00 | 45 00 | 40 00 | 29 00 | 351 00 | 94 00 | 32 00 | 25 00 | 18 00 | 837 00 | 790 00 | 788 00 |
| Housatonic, | 11 00 | 20 00 | 19 00 | 4 00 | 40 00 | 28 00 | 4 00 | 111 00 | 49 00 | 21 00 | 10 00 | 40 00 | 412 00 | 357 00 | 357 00 |
| Hoosac Valley, | 14 00 | 21 00 | 18 00 | 6 00 | 10 00 | 18 00 | 6 00 | 93 00 | 26 00 | 6 00 | 17 00 | – | 349 00 | 235 00 | 224 00 |
| Norfolk, | 37 00 | 76 00 | 30 00 | – | 6 00 | – | 14 00 | 164 00 | 16 00 | 31 00 | 25 00 | – | 547 00 | 402 00 | 193 00 |
| Bristol, | 53 00 | 50 00 | 35 00 | 7 00 | 67 00 | 40 00 | 50 00 | 84 00 | 23 00 | 14 00 | 23 50 | – | 372 00 | 446 50 | 446 50 |
| Plymouth, | 10 00 | 36 00 | 19 00 | 15 00 | 20 00 | 22 00 | 32 00 | 147 00 | 30 00 | – | 6 00 | – | 416 00 | 337 00 | 358 50 |
| Barnstable, | 20 00 | 14 00 | 9 00 | 6 00 | 14 00 | 12 00 | 24 00 | 15 00 | 15 00 | 20 00 | 15 00 | 31 00 | 263 00 | 195 00 | 195 00 |
| Nantucket, | 7 00 | 21 00 | 14 00 | – | 7 00 | 7 00 | – | 44 00 | 14 00 | 8 00 | 13 00 | – | 219 00 | 135 00 | 131 00 |
| Martha's Vineyard, | 12 50 | 7 00 | 7 00 | – | 12 00 | 3 00 | 26 00 | 15 50 | 25 50 | 8 00 | 8 25 | – | 180 25 | 124 75 | * |
| Totals, | $612 50 | $681 40 | $447 90 | $212 90 | $649 20 | $488 85 | $542 20 | $3,284 30 | $575 90 | $442 80 | $281 37 | $788 50 | $10,625 50 | $9,168 32 | $7,849 60 |

* Premiums paid after January 1, 1864.

## ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED—Continued.

### *For Farm Products.*

| SOCIETIES. | Indian Corn. | Wheat. | Rye. | Barley. | Oats. | Beans. | Grass Crops. | Grass Seeds. | Potatoes. | Carrots. | Beets. | Parsnips. | English Turnips. | Ruta-Bagas. | Onions. | Other Root Crops. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Massachusetts, | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Essex, | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | $18 00 |
| Middlesex, | $5 00 | – | $3 00 | – | – | – | – | – | – | $2 00 | $2 00 | – | – | – | – | 2 00* |
| Middlesex North, | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | 20 75* |
| Middlesex South, | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | 22 75* |
| Worcester, | 4 00 | $4 00 | 2 00 | – | $1 00 | $1 00 | – | – | $1 00 | – | – | – | – | – | – | 10 00* |
| Worcester West, | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Worcester North, | 16 00 | 13 00 | – | $3 00 | – | 2 00 | – | $2 00 | – | – | – | – | – | – | – | – |
| Worcester South, | 15 00 | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Worcester South-East, | – | – | – | – | – | 6 00 | – | – | – | – | – | – | – | – | $5 00 | – |
| Hampshire, Franklin & Hampden, | 1 00 | 1 00 | 2 00 | – | – | – | – | 1 00 | 1 00 | – | 1 00 | – | $1 00 | – | 1 00 | – |
| Hampshire, | 2 00 | 2 00 | 1 00 | 1 00 | 2 00 | 1 00 | $6 00 | 1 00 | 1 00 | 1 00 | 1 00 | $1 00 | – | – | 1 00 | 6 50 |
| Highland, | 5 00 | 3 00 | 3 50 | 3 00 | 5 00 | 2 00 | 5 00 | – | 5 00 | 5 00 | 2 00 | 1 00 | 2 00 | – | – | 6 00 |
| Hampden, | – | – | – | – | – | – | – | 4 00 | – | – | – | – | – | – | – | – |
| Hampden East, | 4 00 | 1 00 | 50 | – | 75 | 1 25 | – | – | 1 50 | 75 | 50 | 50 | 1 75 | – | 2 00 | – |
| Franklin, | – | – | – | – | – | – | – | 1 00 | – | – | – | – | – | – | – | – |
| Berkshire, | 27 00 | 20 00 | 20 00 | 14 00 | 20 00 | 6 00 | 14 00 | 3 00 | 28 00 | 12 00 | 5 00 | 6 00 | 2 00 | $6 00 | 5 00 | 20 00 |
| Housatonic, | 35 50 | 18 00 | 16 00 | 7 00 | 18 00 | 6 00 | 6 00 | 8 00 | 14 00 | – | – | – | – | – | – | – |
| Hoosac Valley, | 10 00 | 10 00 | – | 6 00 | 10 00 | 2 00 | – | 2 00 | 15 00 | – | 2 00 | – | 3 00 | – | – | – |
| Norfolk, | – | – | – | – | – | – | – | – | 3 00 | – | – | – | – | – | – | 4 00 |
| Bristol, | 32 00 | 8 00 | – | 6 00 | – | 4 00 | – | – | 6 00 | – | – | – | – | 6 00 | – | 14 00 |
| Plymouth, | 25 00 | 7 00 | 7 00 | 11 00 | 7 00 | 5 00 | – | – | 10 00 | – | – | – | 7 00 | – | – | – |
| Barnstable, | 12 00 | – | – | – | – | – | – | – | 8 00 | – | – | – | 2 00 | 3 00 | – | – |
| Nantucket, | 13 00 | – | – | – | – | – | – | – | 5 00 | – | – | – | – | – | – | 19 75 |
| Martha's Vineyard, | – | 3 50 | – | – | 7 25 | 50 | 3 50 | – | 4 00 | 75 | 75 | – | 2 25 | – | 4 75 | – |
| Totals, | $206 50 | $90 50 | $55 00 | $51 00 | $71 00 | $36 75 | $34 50 | $22 00 | $102 50 | $21 50 | $14 25 | $8 50 | $21 00 | $15 00 | $18 75 | $143 75 |

* Vegetables.

## *Farm Products*—Concluded.

| SOCIETIES. | Total amount offered for Grain & Root Crops. | Total am't awarded for Grain & Root Crops. | Total am't paid for Grain and Root Crops. | BroomcornBrush. | Fruits. | Flowers. | Any other cultivated Crops. | Milk. | Butter. | Cheese. | Honey. | Wheat Bread. | Rye and Indian Bread. | Corn Bread. | Total am't paid out under the head of Farm Products. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Massachusetts, | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Essex, | $130 00 | $18 00 | $18 00 | - | $77 00 | $18 50 | $28 00 | - | $14 00 | $14 00 | $2 00 | - | $5 75 | - | $158 00 |
| Middlesex, | 48 00 | 26 00 | 26 00 | - | 87 00 | 20 00 | - | - | 20 00 | - | - | $11 00 | 3 00 | - | 167 00 |
| Middlesex North, | 107 00 | 20 75 | 7 50 | - | 62 50 | - | - | - | 14 00 | - | - | 12 00 | 6 00 | - | 65 25 |
| Middlesex South, | 92 00 | 32 00 | 32 00 | - | 36 00 | 10 00 | - | - | 14 00 | - | 15 00 | 6 00 | 6 00 | - | 265 00 |
| Worcester, | 102 00 | 80 50 | 65 00 | - | 43 00 | 8 00 | 7 50 | - | 21 00 | 21 00 | - | 2 00 | 2 00 | - | 138 30 |
| Worcester West, | 55 00 | - | - | - | 18 00 | 11 00 | - | - | 10 00 | 36 00 | - | 6 00 | 6 00 | - | 71 00 |
| Worcester North, | 99 00 | 36 00 | 36 00 | - | 55 50 | 7 50 | 43 75 | - | 17 50 | 2 00 | 3 00 | 4 50 | 4 50 | - | 168 75 |
| Worcester South, | 50 00 | 15 00 | 15 00 | - | 29 25 | 4 00 | 10 95 | - | 9 00 | 9 00 | 25 | 12 00 | 6 00 | $0 50 | 125 95 |
| Worcester South-East, | 90 00 | 11 00 | 11 00 | - | 45 50 | 9 90 | - | - | 19 00 | 7 00 | 2 75 | 7 00 | 3 50 | - | 100 05 |
| Hampshire, Franklin and Hampden, | 92 00 | 15 00 | 12 00 | - | 54 50 | 9 00 | 16 00 | - | 10 00 | 6 00 | 2 00 | 3 00 | 3 00 | 1 50 | 94 25 |
| Hampshire, | 61 80 | 27 50 | 27 50 | $1 00 | 30 00 | 13 00 | 1 50 | $1 50 | 6 00 | 5 00 | 1 00 | 3 00 | 6 00 | 2 00 | 70 00 |
| Highland, | 49 00 | 47 50 | 47 50 | - | 5 00 | - | 4 00 | 3 50 | 5 00 | 6 50 | 1 50 | 75 | 75 | 1 25 | 75 75 |
| Hampden, | 137 00 | 4 00 | 4 00 | - | 71 50 | 5 00 | 40 75 | - | 23 00 | 9 00 | 7 75 | 1 50 | 1 50 | 50 | 130 75 |
| Hampden East, | 89 95 | 14 00 | 14 00 | - | 13 50 | 8 25 | - | - | 5 00 | 5 00 | 2 00 | 1 50 | 1 50 | - | 55 75 |
| Franklin, | - | - | - | - | 33 10 | 6 00 | 5 10 | - | 10 20 | 10 20 | 12 50 | 2 75 | 3 50 | - | 77 35 |
| Berkshire, | 221 00 | 208 00 | 208 00 | - | 32 00 | 9 50 | 33 00 | 6 00 | 20 00 | 21 00 | 6 00 | 3 00 | 6 00 | 3 00 | 359 50 |
| Housatonic, | 167 50 | 128 50 | 128 50 | - | 34 00 | 4 50 | 24 00 | 10 00 | 15 00 | 15 00 | 4 00 | 1 50 | 1 50 | 1 50 | 229 50 |
| Hoosac Valley, | 93 00 | 72 00 | 70 00 | - | 12 00 | 10 00 | - | - | 10 00 | 10 00 | 6 00 | 3 00 | 3 00 | 1 00 | 113 00 |
| Norfolk, | 137 00 | 7 00 | 25 00 | - | 34 00 | 21 00 | - | - | 31 00 | 3 00 | 2 00 | 15 00 | 5 00 | - | 172 50 |
| Bristol, | 196 00 | 76 00 | 76 00 | - | 81 75 | 16 00 | 33 50 | - | 20 00 | 14 00 | 12 00 | 4 75 | 2 75 | 9 75 | 270 50 |
| Plymouth, | 153 00 | 54 00 | 87 00 | - | 58 00 | 33 25 | 4 00 | - | 21 00 | 21 00 | 50 | 5 75 | 5 75 | - | 99 00 |
| Barnstable, | 89 00 | 25 00 | 25 00 | - | 10 00 | 12 86 | 20 00 | - | 6 00 | 5 00 | - | 6 00 | 6 00 | 6 00 | 96 86 |
| Nantucket, | 176 00 | 37 50 | 36 25 | - | 31 00 | 8 50 | - | - | 11 00 | 2 00 | 1 00 | 50 | - | - | 90 25 |
| Martha's Vineyard, | 127 75 | 27 75 | - | - | 24 75 | 4 75 | - | - | 13 50 | 5 00 | - | 2 00 | 2 25 | - | * |
| Totals, | $2,563 00 | $983 00 | $972 25 | $1 00 | $978 85 | $250 51 | $275 05 | $21 00 | $315 20 | $226 70 | $81 25 | $114 50 | $91 25 | $27 00 | $3,175 26 |

* Premiums paid after January 1, 1864

## ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED—Concluded.

### *Miscellaneous.*

| SOCIETIES. | Amount awarded for agricultural implements. | Amount offered for raising forest trees. | Amount awarded and paid out for the same. | Am't offered for experiments on manures in accordance with the requirements of the Board, payable in '63. | Am't awarded for all other objects strictly agricultural, not specified before. | For mechanical inventions, domestic manufactures, &c. | No. of persons who received premiums and gratuities. |
|---|---|---|---|---|---|---|---|
| Massachusetts, . . | – | $1,000 00 | $225 00 | – | – | – | – |
| Essex, . . . . . | $20 00 | 30 00 | – | $60 00 | – | $77 00 | 310 |
| Middlesex, . . . | 20 00 | – | – | 60 00 | – | 41 75 | 206 |
| Middlesex North, . . | 3 00 | – | – | 60 00 | – | – | – |
| Middlesex South, . . | – | 105 00 | 40 00 | 60 00 | – | 82 00 | 180 |
| Worcester, . . . | 20 00 | 22 00 | – | 60 00 | – | 14 00 | 127 |
| Worcester West, . . | 6 00 | 30 00 | – | 60 00 | $8 00 | 45 00 | 154 |
| Worcester North, . . | 12 50 | 50 00 | – | 60 00 | – | 147 50 | 253 |
| Worcester South, . . | – | 35 00 | – | 75 00 | – | 52 28 | 145 |
| Worcester South-East, . | 3 00 | 30 00 | – | 60 00 | 17 00 | 90 40 | 238 |
| Hampshire, Franklin and Hampden, . | 6 00 | 20 00 | – | 45 00 | – | 82 00 | 245 |
| Hampshire, . . . | 17 00 | 15 00 | – | – | – | 70 75 | 165 |
| Highland, . . . | – | – | – | 45 00 | – | 63 50 | 140 |
| Hampden, . . . | 13 00 | 18 00 | – | 30 00 | – | 103 25 | 108 |
| Hampden East, . . | 3 00 | 25 00 | – | 60 00 | 22 10 | 59 80 | 98 |
| Franklin, . . . | 5 00 | 10 00 | – | 45 00 | – | 41 00 | 176 |
| Berkshire, . . . | 34 50 | – | – | 30 00 | – | 99 00 | 315 |
| Housatonic, . . . | – | – | – | – | 3 00 | 92 50 | 223 |
| Hoosac Valley, . . | – | – | – | 50 00 | – | 132 75 | 217 |
| Norfolk, . . . . | 20 00 | 31 00 | – | 60 00 | – | 38 00 | 140 |
| Bristol, . . . . | – | 48 00 | 35 00 | 60 00 | – | 117 00 | 487 |
| Plymouth, . . . | – | – | – | 60 00 | 8 00 | 183 73 | 329 |
| Barnstable, . . . | – | 8 00 | 5 00 | 60 00 | – | 67 74 | 205 |
| Nantucket, . . . | – | 13 00 | – | 60 00 | 12 00 | 31 25 | 148 |
| Martha's Vineyard, . | – | 40 00 | – | 60 00 | 40 62 | 54 27 | 150 |
| Totals, . . . | $183 00 | $1,530 00 | $305 00 | $12,280 00 | $110 72 | $1,746 47 | 4,757 |

*NAMES of the Cities and Towns in which resided the persons when receiving the Premiums and Gratuities awarded by the County Societies, and the several amounts as disbursed.*

## ESSEX.

| | | | |
|---|---|---|---|
| Andover, | $126 50 | Middleton, | $0 50 |
| Beverly, | 1 75 | Newbury, | 68 00 |
| Boxford, | 14 50 | Newburyport, | 10 00 |
| Bradford, | 4 00 | North Andover, | 136 75 |
| Danvers, | 71 50 | Salem, | 29 25 |
| Georgetown, | 11 00 | Saugus, | 1 00 |
| Groveland, | 7 00 | South Danvers, | 24 00 |
| Lawrence, | 19 50 | Topsfield, | 7 50 |
| Lynnfield, | 1 00 | West Amesbury, | 3 00 |
| Marblehead, | 24 50 | West Newbury, | 60 00 |
| Methuen, | 31 00 | Total, | $652 25 |

## MIDDLESEX.

| | | | |
|---|---|---|---|
| Acton, | $52 75 | Feltonville, | $5 00 |
| Ashland, | 6 00 | Framingham, | 26 25 |
| Belmont, | 50 00 | Lincoln, | 49 00 |
| Boston, | 9 00 | Lexington, | 27 50 |
| Brighton, | 3 00 | Melrose, | 5 00 |
| Cambridge, | 11 00 | Somerville, | 5 00 |
| Carlisle, | 13 00 | Stow, | 15 25 |
| Chelmsford, | 13 00 | Sudbury, | 12 00 |
| Concord, | 146 75 | Waltham, | 26 50 |
| Bedford, | 2 00 | Wayland, | 37 25 |
| Dracut, | 14 00 | West Cambridge, | 16 00 |

## WORCESTER SOUTH.

| | | | |
|---|---|---|---|
| Brimfield, | $19 50 | Southbridge, | $60 75 |
| Brookfield, | 33 50 | Spencer, | 5 00 |
| Charlton, | 69 10 | Sturbridge, | 179 28 |
| Dudley, | 29 95 | Warren, | 8 50 |
| Holland, | 5 25 | Total, | $410 83 |

## WORCESTER SOUTH-EAST.

| | | | |
|---|---|---|---|
| Bellingham, | $8 75 | Milford, | $241 76 |
| Blackstone, | 6 25 | Northbridge, | 14 00 |
| Framingham, | 6 00 | Sherburne, | 2 00 |
| Franklin, | 2 00 | Southborough, | 4 00 |
| Grafton, | 4 00 | Sutton, | 36 00 |
| Holliston, | 12 35 | Upton, | 30 65 |
| Hopkinton, | 27 50 | Uxbridge, | 70 00 |
| Medway, | 19 50 | Westborough, | 11 00 |
| Mendon, | 96 10 | Total, | $591 86 |

## HAMPSHIRE, FRANKLIN AND HAMPDEN.

| | | | |
|---|---|---|---|
| Amherst, | $3 50 | Granby, | $16 00 |
| Ashfield, | 1 00 | Greenfield, | 6 00 |
| Becket, | 10 00 | Hadley, | 76 50 |
| Belchertown, | 5 00 | Hatfield, | 52 00 |
| Chicopee, | 8 00 | Holyoke, | 6 50 |
| Cummington, | 3 50 | Huntington, | 1 50 |
| Easthampton, | 47 50 | Northampton, | 268 50 |
| Enfield, | 2 00 | Plainfield, | 1 00 |
| Goshen, | 13 00 | Southampton, | 26 75 |

## HAMPSHIRE, FRANKLIN AND HAMPDEN—Concluded.

| | |
|---|---|
| South Hadley, | $39 00 |
| Shelburne, | 62 00 |
| Sunderland, | 12 50 |
| Ware, | 3 00 |
| Westfield, | 58 00 |
| Westhampton, | $23 00 |
| Whately, | 12 00 |
| Williamsburg, | 10 50 |
| Total, | $768 25 |

## HAMPSHIRE.

| | |
|---|---|
| Amherst, | $191 65 |
| Belchertown, | 30 00 |
| Boston, | 5 00 |
| Buckland, | 25 |
| Enfield, | 4 00 |
| Granby, | 7 00 |
| Hadley, | 61 00 |
| Leverett, | 18 10 |
| Northampton, | $20 88 |
| Orange, | 4 00 |
| Pelham, | 9 00 |
| South Deerfield, | 7 50 |
| Sunderland, | 48 38 |
| Whately, | 5 00 |
| Total, | $411 76 |

## HIGHLAND.

| | |
|---|---|
| Becket, | $80 50 |
| Blandford, | 3 00 |
| Cheshire, | 5 00 |
| Chester, | 46 50 |
| Cummington, | 5 00 |
| Dalton, | 4 00 |
| Hinsdale, | 66 50 |
| Huntington, | 1 50 |
| Lee, | 18 00 |
| Middlefield, | $126 87 |
| Montgomery, | 3 00 |
| Peru, | 18 75 |
| Pittsfield, | 1 50 |
| Sandisfield, | 5 00 |
| Washington, | 4 50 |
| Worthington, | 13 00 |
| Total, | $402 62 |

## HAMPDEN.

| | | | |
|---|---|---|---|
| Agawam, | $25 00 | Russell, | $8 50 |
| Chester, | 4 00 | South Hadley, | 5 00 |
| Chicopee, | 18 74 | Southwick, | 3 00 |
| Hartford, | 3 75 | Springfield, | 287 75 |
| Holyoke, | 8 00 | Westfield, | 115 00 |
| Longmeadow, | 32 00 | West Springfield, | 50 00 |
| Ludlow, | 42 00 | Wilbraham, | 126 50 |
| Northampton, | 10 00 | Other places, | 392 00 |
| Palmer, | 170 00 | Total, | $1,282 99 |
| Roxbury, | 2 00 | | |

## HAMPDEN EAST.

| | | | |
|---|---|---|---|
| Belchertown, | $8 25 | Wales, | $2 25 |
| Brimfield, | 63 75 | Warren, | 8 00 |
| Ludlow, | 13 00 | Wilbraham, | 51 00 |
| Monson, | 117 50 | Total, | $387 76 |
| Palmer, | 124 01 | | |

## FRANKLIN.

| | | | |
|---|---|---|---|
| Ashfield, | $11 00 | Leverett, | $2 00 |
| Bernardston, | 5 00 | Leyden, | 14 05 |
| Charlemont, | 1 00 | Montague, | 4 50 |
| Colrain, | 18 20 | Northfield, | 6 00 |
| Conway, | 42 45 | Orange, | 3 00 |
| Deerfield, | 111 15 | Shelburne, | 213 25 |
| Erving, | 3 00 | Sunderland, | 17 20 |
| Gill, | 5 00 | Whately, | 2 00 |
| Greenfield, | 88 50 | Total, | $547 30 |

## BERKSHIRE.

| | | | |
|---|---|---|---|
| Adams, | $11 00 | New Ashford, | $1 50 |
| Alford, | 2 50 | Pittsfield, | 364 00 |
| Becket, | 29 00 | Richmond, | 23 00 |
| Cheshire, | 88 50 | Sheffield, | 21 00 |
| Curtisville, | 10 00 | South Adams, | 36 50 |
| Dalton, | 54 00 | South Williamstown, | 6 00 |
| Great Barrington, | 73 50 | Stockbridge, | 72 50 |
| Hancock, | 3 50 | Tyringham, | 50 |
| Hinsdale, | 39 50 | Williamstown, | 46 00 |
| Lanesborough, | 148 50 | Windsor, | 9 50 |
| Lee, | 88 00 | Not known, | 100 00 |
| Lenox, | 165 00 | Total, | $1,313 50 |

## HOUSATONIC.

| | | | |
|---|---|---|---|
| Alford, | $52 50 | North Becket, | $3 00 |
| Egremont, | 75 00 | Richmond, | 3 00 |
| Great Barrington, | 197 50 | Sandisfield, | 10 50 |
| Lee, | 82 50 | Sheffield, | 155 00 |
| Lenox, | 81 00 | South Adams, | 1 00 |
| Monterey, | 14 00 | Stockbridge, | 80 00 |
| Mount Washington, | 6 00 | Tyringham, | 1 00 |
| New Marlborough, | 17 50 | West Stockbridge, | 6 50 |
| Norfolk, | 1 00 | Total, | $787 00 |

## HOOSAC VALLEY.

| | | | |
|---|---|---|---|
| Cheshire, | $66 00 | Florida, | $22 75 |
| Clarksburg, | 10 20 | Hinsdale, | 6 00 |

## HOOSAC VALLEY—CONCLUDED.

| | | | |
|---|---|---|---|
| Lanesborough, | $3 00 | South Adams, | $94 50 |
| North Adams, | 177 25 | Stamford, | 7 50 |
| Pittsfield, | 1 00 | Williamstown, | 120 25 |
| Pownal, | 10 00 | Total, | $518 75 |

## NORFOLK.

| | | | |
|---|---|---|---|
| Brookline, | $13 00 | Needham, | $93 00 |
| Canton, | 42 00 | Randolph, | 1 00 |
| Dedham, | 134 33 | Roxbury, | 29 50 |
| Dorchester, | 55 00 | Sharon, | 16 00 |
| Dover, | 32 00 | Stoughton, | 39 00 |
| Foxborough, | 30 00 | Walpole, | 23 25 |
| Franklin, | 30 00 | West Roxbury, | 48 00 |
| Medfield, | 36 50 | Weymouth, | 23 00 |
| Medway, | 4 00 | Wrentham, | 12 00 |
| Milton, | 17 00 | Total, | $652 08 |

## BRISTOL.

| | | | |
|---|---|---|---|
| Attleborough, | $22 25 | Norton, | $113 25 |
| Berkley, | 65 25 | Raynham, | 199 00 |
| Dighton, | 29 75 | Rehoboth, | 19 00 |
| Easton, | 55 25 | Seekonk, | 50 |
| Fall River, | 13 25 | Somerset, | 9 25 |
| Freetown, | 1 00 | Swanzey, | 1 50 |
| Mansfield, | 35 25 | Taunton, | 443 75 |
| New Bedford, | 8 25 | Total, | $1,016 50 |

## PLYMOUTH.

| | | | |
|---|---|---|---|
| Abington, | $13 12 | Mattapoisett, | $3 25 |
| Bridgewater, | 303 34 | Middleborough, | 195 62 |
| Carver, | 5 50 | North Bridgewater, | 130 50 |
| Duxbury, | 3 50 | Pembroke, | 6 00 |
| East Bridgewater, | 54 86 | Plymouth, | 41 87 |
| Halifax, | 121 25 | Plympton, | 8 12 |
| Hanson, | 11 00 | Rochester, | 1 25 |
| Hingham, | 3 00 | Scituate, | 6 00 |
| Kingston, | 16 25 | Wareham, | 5 00 |
| Lakeville, | 31 00 | West Bridgewater, | 100 25 |
| Marion, | 10 00 | Unknown, | 50 |
| Marshfield, | 75 | Total, | $1,071 93 |

## BARNSTABLE.

| | | | |
|---|---|---|---|
| Barnstable, | $371 10 | Sandwich, | $17 00 |
| Chatham, | 7 00 | Yarmouth, | 3 75 |
| Orleans, | 6 75 | Total, | $405 60 |

## NANTUCKET.

| | |
|---|---|
| Nantucket, | $265 75 |

## MARTHA'S VINEYARD.

| | | | |
|---|---|---|---|
| Chilmark, | $111 01 | Tisbury, | $178 55 |
| Edgartown, | 43 58 | Total, | $333 14 |

## ORNITHOLOGY OF MASSACHUSETTS—LIST OF SPECIES.

BY E. A. SAMUELS.

[NOTE. The following Catalogue has been prepared in compliance with numerous and repeated requests. It includes, so far as the observations of the author, and many other students in this department have extended, a list of all the species that have been obtained in the State, together with brief descriptive notes concerning their habits, &c.

The classification and nomenclature are those adopted by the Smithsonian Institution. It is, probably, the best existing arrangement, and is rapidly superseding all others with American Ornithologists.]

TURKEY BUZZARD, *Cathartes aura.* Illig. Rare. 2 specimens shot in 1863.

DUCK HAWK, Great-footed Hawk, *Falco anatum.* Bonap. Rare. Winter.

PIGEON HAWK, Bullet Hawk, *Hypotriorchis columbarius.* Gr. Common. Resident. Breeds. Nests in trees; eggs 4 or 5; laid in May.

JER FALCON, *Falco islandicus.* Sabine. Rare. Winter visitor.

SPARROW HAWK, *Tinnunculus sparverius.* Vieillot. Common or not rare. Resident. Breeds; nests in trees; eggs 3 or 4; laid in May.

GOS HAWK, *Astur atricapillus.* Bonap. Common. Resident. Probably breeds, as specimens are often seen in summer.

COOPER'S HAWK, *Accipiter cooperii.* Bonap. Common. Resident. Breeds; nests in high forks of trees; eggs 3 or 4; laid in May.

SHARP-SHINNED HAWK, *Accipiter fuscus.* Bonap. Common. Resident. Breeds; nests in trees, usually; eggs 4 or 5; laid in May.

RED-TAILED HAWK, *Buteo borealis.* Vieill. Common. Resident. Breeds; nests in deep woods, in high forks of trees; eggs 3 or 4; laid in May.

RED-SHOULDERED HAWK, *Buteo lineatus.* Jardine. Common. Resident. Breeds; nest in trees; eggs 3 or 4; laid in May.

BROAD-WINGED HAWK, *Buteo pennsylvanicus.* Bonap. Rare. Resident. A pair bred in Newton in 1863; nest in high fork; eggs 2.

ROUGH-LEGGED HAWK, *Archibuteo lagopus.* Gray. Rare. No instance on record of breeding here.

BLACK HAWK, *Archibuteo sancti-johannis.* Gray. Rare visitor in winter.

MARSH HAWK, *Circus hudsonius.* Vieillot. Common. Summer visitor. Breeds; nests in marshes, on the ground; eggs 4 to 6; laid early in May.

GOLDEN EAGLE, *Aquila canadensis.* Cassin. Rare. Not known to breed.

BALD EAGLE, *Haliaetus leucocephalus.* Savigny. Rare. Does not breed in the State.

FISH HAWK, Osprey, *Pandion carolinensis.* Bon. Not rare. Summer visitor. Occasionally breeds; nests in forks of trees; eggs laid in April or May.

GREAT HORNED OWL, *Bubo virginianus.* Bon. Common. Resident. Breeds; nests in hollows of trees, and in high forks of pines; eggs 2 to 4, laid in March.

Mottled Owl, Screech Owl, *Scops asio*. Bonap. Common. Resident. Nests in hollow trees; eggs 3 or 4, laid in March or April.

Long-eared Owl, *Otus wilsonianus*. Lesson. Not rare. Resident. Breeds; nests in hollow trees and high pines; eggs 2 to 4, laid in March or April.

Short-eared Owl, *Brachyotus cassinii*. Brewer. Not rare. Resident in open winters. Probably breeds, as specimens are often shot in summer.

Great Gray Owl, *Syrnium cinereum*. Aud. Very rare, in winter.

Barred Owl, *Syrnium nebulosum*. Gray. Common in some districts. Resident. Probably breeds.

Sparrow Owl, *Nyctale richardsonii*. Bonap. Rare. Occasional resident. Not known to breed.

Saw-whet Owl, *Nyctale acadica*. Bon. Rare. Occasionally resident. Breeds.

Snowy Owl, *Nyctea nivea*. Gray. Common. Winter visitor.

Hawk Owl, *Surnia ulula*. Bonap. Very rare in winter.

Yellow-billed Cuckoo, *Coccygus americanus*. Bonap. Common. Summer visitor. Breeds; nests in shrubs and bushes; eggs 4 or 5; laid in May.

Black-billed Cuckoo, *Coccygus erythrophthalmus*. Bonap. Common. Summer visitor. Breeds; nests in bushes and low trees; eggs 4 or 5; laid in May.

Hairy Woodpecker, *Picus villosus*. Linn. Common. Resident. Breeds; nests in excavations in trunks and limbs of trees; eggs 4 to 6; laid in May.

Downy Woodpecker, *Picus pubescens*. Linn. Common. Resident. Breeds; nests in excavations in trees; eggs 4 to 6; laid in last week in April or first of May.

Black-backed, Three-toed, Woodpecker, *Picoides arcticus*. Gray. Rare. Winter visitor. Not known to breed.

Banded Three-toed, Woodpecker, *Picoides hirsutus*. Gray. Very rare. Winter visitor. Not known to breed.

Yellow-bellied Woodpecker, *Sphyropicus varius*. Baird. Not rare. Summer visitor. Breeds; nests in excavations in trees; eggs 4 to 6; laid in May.

Black Woodcock, Pileated Woodpecker, *Hylotomus pileatus*. Baird. Not common. Resident. Breeds; nests in hollow trees, and in excavations made by the bird; eggs 4 to 6; laid in May.

Red-headed Woodpecker, *Melanerpes erythrocephalus*. Sw. Not common. Summer visitor. Breeds; nests in excavations in trees; eggs 4 to 6; laid in May or June.

Golden-winged Woodpecker, Yellow-shafted Woodpecker. *Colaptes auratus*. Sw. Common. Summer visitor. Resident in mild winters. Breeds; nests in excavations in trees; eggs 4 to 6; laid in May.

Ruby-throated Humming-bird, *Trochilus colubris*. Linn. Common. Summer visitor. Breeds; nests in trees; eggs 2; laid in May or June.

Chimney Swallow, *Chaetura pelasgia.* Steph. Common. Summer visitor. Breeds; nests in chimneys and hollow trees; eggs 4 to 5; laid in May.

Whip-poor-will, *Antrostomus vociferus.* Bonap. Common. Summer visitor. Breeds; eggs 2 in number; laid on the ground in May or June.

Night Hawk, *Chordeiles popetue.* Baird. Common. Summer visitor. Breeds; eggs 2; laid on the bare ground or rock in May.

Belted Kingfisher, *Ceryle alcyon.* Boie. Common. Summer visitor. Breeds; nests in excavations in sand-banks; eggs 4 to 6; laid in April or May.

King Bird, *Tyrannus carolinensis.* Baird. Common. Summer visitor. Breeds; nests in trees, usually in orchards; eggs 4 to 5; laid in May.

Great-crested Flycatcher, *Myiarchus crinitus.* Cab. Not common. Summer visitor. Breeds occasionally; nests in holes in trees and fences; eggs 4; laid in May or June.

Pewee, Phebe Bird, *Sayornis fuscus.* Baird. Common. Summer visitor. Breeds, often twice; nests beneath bridges, and in caves and sheds; eggs 4 to 5; laid in May and July.

Olive-sided Flycatcher, *Contopus borealis.* Baird. Not common. Summer visitor. Breeds; nests in cedar trees; eggs 4; laid in May or June.

Wood Pewee, *Contopus virens.* Cab. Common. Summer visitor. Breeds; nests in trees in deep woods; eggs 4 to 5; laid in May or June.

Traill's Flycatcher, *Empidonax traillii.* Baird. Not common. Summer visitor. Breeds occasionally; nests in trees like *E. minimus*; eggs 4 to 5; laid in May or June.

Least Flycatcher, *Empidonax minimus.* Baird. Common. Summer visitor. Breeds, often twice; nests in trees, often in orchards; eggs 4 to 5; laid in May and July.

Yellow-bellied Flycatcher, *Empidonax flaviventris.* Baird. Rare. Summer visitor. Probably breeds.

Wood Thrush, Song Thrush, *Turdus mustelinus.* Gm. Common. Summer visitor. Breeds; nests in low trees and shrubs in deep woods; eggs 4 to 5; laid in May.

Hermit Thrush, *Turdus pallasi.* Cab. Common in spring and fall; occasionally seen in summer, and has been known to breed; nests near or on the ground; eggs 4 to 5; laid in May.

Wilson's Thrush, Tawny Thrush, *Turdus fuscescens.* Stephens. Common. Summer visitor. Breeds; nests in bushes, thickets of briers, and often on the ground; eggs 4 to 5; laid in May.

Olive-backed Thrush, *Turdus swainsonii.* Cab. Often seen in spring and fall. Not known to breed in this State.

Gray-cheeked Thrush, *Turdus aliciæ.* Baird. Probably occurs, but have not seen it.

Robin, *Turdus migratorius.* Linn. Common. Summer visitor. Resident in mild winters. Breeds, often twice; nests in trees; eggs 4 to 5; laid in April or May, and July.

Blue Bird, *Sialia sialis.* Baird. Common. Summer visitor. Breeds, often twice; nests in hollow trees and martin boxes; eggs 4 to 5; laid in April and July.

Ruby-crowned Wren, *Regulus calendula.* Licht. Common in spring, fall, and winter. Not known to breed.

Golden-crested Wren, *Regulus satrapa.* Licht. Common in spring, fall, and winter. Not known to breed.

Tit Lark, *Anthus ludovicianus.* Licht. Common in spring and fall.

Black-and-white Creeper, *Mniotilta varia.* Vieill. Common. Summer visitor. Breeds; nests on the ground, near rocks; eggs 4 to 6; laid in May.

Blue, Yellow-backed Warbler, *Parula americana.* Bonap. Not common. Summer visitor. Breeds; nests in small limbs of trees; eggs 4; laid last of May.

Maryland Yellow-throat, *Geothlypis trichas.* Cab. Common. Summer visitor. Breeds; nests on the ground; eggs 4 to 6; laid in May.

Mourning Warbler, *Geothlypis philadelphia.* Baird. Very rare. Summer visitor.

Connecticut Warbler, *Oporornis agilis.* Baird. Occurs rarely in spring and fall.

Yellow-breasted Chat, *Icteria viridis.* Bonap. Rare. Summer visitor. Breeds occasionally; nests in low bushes, near the ground; eggs 4; laid in June.

Worm-eating Warbler, *Helmitherus vermivorus.* Bonap. Not common in spring. Not known to breed.

Blue-winged Yellow Warbler, *Helminthophaga pinus.* Baird. Very rare; a few specimens seen early in June.

Golden-winged Warbler, *Helminthophaga chrysoptera.* Baird. Very rare. Occasionally seen in spring. Not known to breed.

Nashville Warbler, *Helminthophaga ruficapilla.* Baird. Common in spring. Breeds occasionally; nests in small trees; eggs 4 to 5; laid in May or June.

Tennessee Warbler, *Helminthophaga perigrina.* Cab. Probably occurs in spring, rarely.

Golden-crowned Thrush, *Seiurus aurocapillus.* Sw. Common. Summer visitor. Breeds; nests on the ground; eggs 4 to 6; laid in May or June.

Water Thrush, *Seiurus noveboracensis.* Nutt. Not common. Spring and fall visitor. Probably breeds, as birds are often seen in summer.

Black-throated Green Warbler, *Dendroica virens.* Baird. Common in spring. Breeds occasionally; nests in pines; eggs 4; laid in May or June.

Black-throated Blue Warbler, *Dendroica canadensis.* Baird. Very rare in spring.

Yellow-rump, *Dendroica coronata.* Gray. Common in the migrations. Not known to breed.

Blackburnian Warbler, *Dendroica blackburniæ.* Baird. Not common. Probably breeds.

Bay-breasted Warbler, *Dendroica castanea.* Baird. Rare. Only seen in the migrations.

Pine-creeping Warbler, *Dendroica pinus.* Baird. Common in the migrations. Breeds occasionally; nests in pines; eggs 3 to 4; laid in May or June.

Chestnut-sided Warbler, *Dendroica pennsylvanica.* Baird. Common in spring and fall. Breeds; nests in bushes; eggs 3 to 4; laid in May or June.

Black Poll Warbler, *Dendroica striata.* Baird. Common in spring and fall. Not known to breed.

Yellow Warbler, *Dendroica aestiva.* Baird. Common. Summer visitor. Breeds; nests in bushes and low shrubs; eggs 4 to 5; laid in May or June.

Black-and-yellow Warbler, *Dendroica maculosa.* Baird. Rare. Only seen in the migrations.

Cape May Warbler, *Dendroica tigrina.* Baird. Rare. Not known to breed, but probably does, rarely.

Yellow Red-poll Warbler, *Dendroica palmarum.* Baird. Common in the migrations. Not known to breed, but probably does, rarely.

Prairie Warbler, *Dendroica discolor.* Baird. Not common. Summer visitor. Occasionally breeds in Massachusetts, which probably is its northern limit.

Hooded Warbler, *Myiodioctes mitratus.* Aud. Very rare. Summer.

Green Black-cap Flycatcher, *Myiodioctes pusillus.* Bon. Very rare in spring.

Canada Flycatcher, *Myiodioctes canadensis.* Aud. Common in the migrations. Breeds rarely; nests on the ground or in low bushes; eggs 3 to 4; laid in May.

Redstart, *Setophaga ruticilla.* Sw. Common. Summer visitor. Breeds; nests in trees, on low limbs; eggs 4; laid in May or June.

Scarlet Tanager, *Pyranga rubra.* Vieill. Common. Summer visitor. Breeds; nests in trees, usually oaks, in deep woods; eggs 4 to 5; laid in May or June.

Barn Swallow, *Hirundo horreorum.* Barton. Common. Summer visitor. Breeds; nests in eaves of buildings, and in barns and sheds; eggs 4 or 5; laid in May, and often July.

Cliff Swallow, *Hirundo lunifrons.* Say. Common. Summer visitor. Breeds; nests in eaves of buildings, &c.; eggs 4 or 5; laid in May.

White-bellied Swallow, *Hirundo bicolor.* Vieill. Common. Summer visitor. Breeds; nests in hollow trees and martin boxes; eggs 4 to 5; laid in May.

Bank Swallow, *Cotyle riparia.* Boie. Common. Summer visitor. Breeds; nests in excavations in sand-banks; eggs 4 to 5; laid in May.

Purple Martin, *Progne purpurea.* Boie. Common. Summer visitor. Breeds; nests in martin boxes, &c.; eggs 4; laid in May or June.

Wax-wing Chatterer, Bohemian Wax-wing, *Ampelis garrulus.* Linn. Very rare. Winter visitor.

Cedar Bird, Cherry Bird, *Ampelis cedrorum*. Baird. Common. Summer visitor. Is often seen in flocks in mild winters. Breeds; nests in trees; eggs laid last of May.

Great Northern Shrike, Butcher Bird, *Collyrio borealis*. Baird. Common in winter. Said to breed in this State, but doubtful.

Red-eyed Flycatcher, or Vireo, *Vireo olivaceus*. Vieill. Common. Summer visitor. Breeds; nests in low trees; eggs 4; laid in May or June.

Warbling Flycatcher, *Vireo gilvus*. Bonap. Not common. Summer visitor. Breeds; nests in high poplar trees; eggs 4; laid last of May or first of June.

White-eyed Vireo, *Vireo noveboracensis*. Bonap. Common. Summer visitor. Breeds; nests in thickets of briars and vines; eggs 3 to 4; laid first of June.

Blue-headed Flycatcher, *Vireo solitarius*. Vieill. Not common, or rare. Summer visitor. Nests in trees; eggs 4; laid in June.

Yellow-throated Flycatcher, *Vireo flavifrons*. Vieill. Common. Summer visitor. Breeds; nests in low trees; eggs 3 to 4; laid in June.

Mocking Bird, *Mimus polyglottus*. Boie. Rare. Summer visitor; occasionally breeds; nests in bushes; eggs 4 to 5; laid in June.

Cat Bird, *Mimus carolinensis*. Gray. Common. Summer visitor. Breeds, often twice; nests in bushes; eggs 3 to 5; laid in May and July.

Brown Thrush, *Harporhynchus rufus*. Cab. Common. Summer visitor. Breeds, often twice; nests in bushes and small trees; eggs 4 to 5; laid in May and July.

Long-billed Marsh Wren, *Cistothorus palustris*. Cab. Not common. Summer visitor. Breeds; nests in tall grass in marshes; eggs 6 to 8; laid in May or June.

Short-billed Marsh Wren, *Cistothorus stellaris*. Cab. Common. Summer visitor. Breeds; nests in grass in marshes; eggs 6 to 8; laid in May or June.

House Wren, *Troglodytes aedon*. Vieill. Common. Summer visitor. Breeds. Nests in hollow trees, deserted blue bird's nests, martin boxes, &c.; eggs 6 to 9; laid in May and July.

Wood Wren, *Troglodytes americanus*. Aud. Rare. Spring and fall. Possibly breeds.

Winter Wren, *Troglodytes hyemalis*. Vieill. Rare. Occasionally seen in fall, winter, and spring.

American Creeper, *Certhia americana*. Bonap. Common in spring and fall. Possibly breeds; nests in holes in trees, &c.; eggs 6 to 8; laid in May.

White-bellied Nuthatch, *Sitta carolinensis*. Gmelin. Common. Resident. Breeds; nests in holes in trees, &c.; eggs 5; laid in April or May.

Red-bellied Nuthatch, *Sitta canadensis*. Linn. Common in spring, summer, and fall; less common in winter. Breeds; not acquainted with nest.

Black-cap Titmouse, Chickadee, *Parus atricapillus.* Linn. Common. Resident. Breeds; nests in holes in trees, &c.; eggs 5 to 8, and even 10; laid in April or May.

Sky Lark, Shore Lark, *Eremophila cornuta.* Boie. Common in winter.

Pine Grosbeak, *Pinicola canadensis.* Cab. Rare. Winter visitor.

Purple Finch, *Carpodacus purpureus.* Gray. Common. Resident in mild winters. Breeds; nests in pines and cedars, usually; eggs 4 to 5; laid in May or June.

Yellow Bird, Goldfinch, *Chrysomitris tristis.* Bonap. Common summer visitor. Resident in mild winters. Breeds; nests in trees; eggs 4 to 5; laid in June or July.

Pine Finch, *Chrysomitris pinus.* Bonap. Not rare in winter. Has been known to breed; nests in pines; eggs 4 to 5; laid in April or May.

Red Crossbill, *Curvirostra americana.* Wils. Not rare in winter. Has been known to breed; nests in Pines; eggs 4 to 5; laid in February.*

White-winged Crossbill, *Curvirostra leucoptera.* Wils. Not common. Winter visitor.

Lesser Red Poll, *Aegiothus linaria.* Cab. Common. Winter visitor.

Mealy Red Poll, *Aegiothus canescens.* Cab. Very rare. Winter visitor.

Snow Bunting, *Plectrophanes nivalis.* Meyer. Common. Winter visitor.

Lapland Longspur, *Plectrophanes lapponicus.* Selby. Very rare. Winter visitor.

Savannah Sparrow, *Passerculus savanna.* Bonap. Common. Summer visitor. Breeds twice; nests on the ground; eggs 4 to 5; laid in May and July.

Grass Finch, *Poocœtes gramineus.* Baird. Common. Summer visitor. Breeds twice; nests on the ground; eggs 4 to 5; laid in May and July.

Yellow-winged Sparrow, *Coturniculus passerinus.* Bonap. Not common. Breeds occasionally; nests on the ground; eggs 4 to 5; laid in May.

Henslow's Bunting, *Coturniculus henslowi.* Bonap. Very rare. Has been known to breed near Lynn, Mass.

Sharp-tailed Finch, *Ammodromus caudacutus.* Sw. Not rare in summer. Breeds; nests in grass on or near the ground.

Sea-side Finch, *Ammodromus maritimus.* Sw. Common. Summer visitor. Breeds; nests in grass; eggs 4 to 5; laid in May.

White-crowned Sparrow, *Zonotrichia leucophrys.* Sw. Not common in spring and fall.

White-throated Sparrow, *Zonotrichia albicollis.* Bonap. Common in spring and fall. Probably occasionally breeds.

Snow-Bird, *Junco hyemalis.* Sclat. Common in winter. Occasionally breeds; nests on the ground; eggs 4 to 5; laid in June.

Tree Sparrow, *Spizella monticola.* Baird. Common in spring and fall. Occasionally breeds; nests in trees; eggs 3 to 4; laid in May or June.

Field Sparrow, *Spizella pusilla.* Bonap. Common. Summer visitor. Breeds twice; nests on the ground; eggs 4 to 5; laid in April, or May and July.

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* Nuttall.

Chipping Sparrow, *Spizella socialis*. Bonap. Common. Summer visitor. Breeds; nests in trees; eggs 4 to 5; laid in May and July.

Song Sparrow, *Melospiza melodia*. Baird. Common. Summer visitor. Breeds; nests on the ground; eggs 4 to 5; laid in April and July.

Swamp Sparrow, *Melospiza palustris*. Baird. Common. Summer visitor. Breeds; nests on the ground, in swamps; eggs 4 to 5; laid in May.

Fox-colored Sparrow, *Passerella iliaca*. Sw. Common in spring and fall.

Black-throated Bunting, *Euspiza americana*. Bonap. Rare. Summer visitor. Not known to breed.

Rose-breasted Grosbeak, *Guiraca ludoviciana*. Sw. Common. Summer visitor. Breeds; nests in low trees and shrubs, in or near swamps; eggs 4; laid in May or June.

Indigo Bird, *Cyanospiza cyanea*. Baird. Common. Summer visitor. Nests in bushes; eggs 4 to 5 . laid in May or June.

Ground Robin, Towhee Bunting, *Pipilo erythrophthalmus*. Vieill. Common. Summer visitor. Breeds; nests in low bushes and on the ground; eggs 4 to 5; laid in May.

Bob-olink, Reed Bird, *Dolichonyx oryzivorus*. Sw. Common. Summer visitor. Breeds; nests on the ground; eggs 4 to 6; laid in June.

Cow Blackbird, Cow Bunting, *Molothrus pecoris*. Sw. Common. Summer visitor. Breeds; lays its eggs singly in nests of other birds.

Red-winged Blackbird, *Agelaius phœniceus*. Vieill. Common. Summer visitor. Breeds; nests in bushes and tall grass, in meadows and swamps; eggs 4 to 5; laid in May.

Meadow Lark, *Sturnella magna*. Sw. Common. Summer visitor. Breeds; nests on the ground; eggs 4 to 5; laid in May or June.

Orchard Oriole, *Icterus spurius*. Bonap. Not common. Summer visitor. Breeds; nests in trees; eggs 4 to 5; laid in June.

Baltimore Oriole, *Icterus baltimore*. Daudin. Common. Summer visitor. Breeds; nests in trees, usually elms; eggs 4 to 5; laid in June.

Rusty Blackbird, *Scolecophagus ferrugineus*. Sw. Common in spring and fall. Not known to breed.

Boat-tailed Grakle, *Quiscalus major*. Vieill. Rare. Summer visitor. Nests in tall grass and reeds; eggs 5; laid in May or June.

Crow Blackbird, *Quiscalus versicolor*. Vieill. Common. Summer visitor. Breeds; nests in trees; eggs 4 to 6; laid in May.

Raven, *Corvus carnivorous*. Bartram. Very rare visitor.

Common Crow, *Corvus americanus*. Aud. Common. Resident. Breeds; nests in trees; eggs 3 to 5; laid in May.

Fish Crow, *Corvus ossifragus*. Wilson. Very rare visitor in summer.

Blue Jay, *Cyanura cristata*. Sw. Common. Resident. Breeds; nests in trees; eggs 4 to 5; laid in May.

Wild Pigeon, *Ectopistes migratoria*. Sw. Common. Summer visitor. Occasionally breeds; nests in trees; eggs 2; laid in April or May.

Common Dove, *Zenaidura carolinensis*. Bonap. Common. Summer visitor. Breeds; nests in trees; eggs 2; laid in May.

Prairie Hen, Pinnated Grouse, *Cupidonia cupido.* Baird. Only found on Martha's Vineyard and Naushon. Breeds; nests on ground.

Ruffed Grouse, *Bonasa umbellus.* Stephens. Common. Resident. Breeds; nests on ground; eggs 6 to 10; laid in May.

Quail, Virginian Partridge, *Ortyx virginianus*, Bonap. Common. Resident. Breeds; nests on the ground; eggs 6 to 12; laid in May.

Great Blue Heron, *Ardea herodias.* Linn. Common. Summer visitor. Breeds; nests in pines and cedars; eggs 3; laid in May.

Blue Heron, *Florida cœrulea.* Baird. Very rare. Summer visitor.

Least Bittern, *Ardetta exilis.* Gray. Not very common. Summer visitor. Breeds; nests on bushes, or near the ground; eggs 3 to 4; laid in May.

Bittern, Stake Driver, *Botaurus lentiginosus.* Steph. Common. Summer visitor. Breeds; nests in bushes; eggs 3 to 5; laid in April or May.

Green Heron, *Butorides virescens.* Bonap. Common. Summer visitor. Breeds; nests in bushes or trees; eggs 3 or 4; laid in April or May.

Night Heron, *Nyctiardea gardeni.* Baird. Common. Summer visitor. Breeds; nests in trees; eggs 3 to 4; laid in May or June.

Golden Plover, *Charadrius virginicus.* Borck. Common in spring and fall in the migrations. Not known to breed.

Killdeer Plover, *Aegialitis vociferus.* Cassin. Common in fall and spring. Occasionally breeds; nests on the ground; eggs 3 to 4; laid in April or May.

Wilson's Plover, *Aegialitis wilsonius.* Cassin. Common in fall and spring.

Semipalmated Plover, *Aegialitis semipalmatus.* Cab. Common in the migrations.

Piping Plover, *Aegialitis melodus.* Cab. Passes through the State in migrating.

Black-bellied Plover, *Squatarola helvetica.* Cuv. Passes through the State in the migrations.

Turnstone, *Strepsilas interpres.* Illig. Rare in the migrations.

Northern Phalarope, *Phalaropus hyperboreus.* Bonap. Rare in spring and fall.

American Woodcock, *Philohela minor.* Gray. Common. Summer visitor. Breeds, often twice; nests on the ground; eggs 4 to 5; laid in April, or May and July.

English Snipe, *Gallinago wilsonii.* Bonap. Common in fall and spring. Occasionally breeds; nests on the ground; eggs 4; laid in May.

Red-breasted Snipe, *Macrorhamphus griseus.* Leach. Not common in the migrations.

Knot, *Tringa canutus.* Linn. Rare in fall and spring.

Purple Sandpiper, *Tringa maritima.* Brunnich. Rare in spring and fall.

Red-backed Sandpiper, *Tringa alpina, var. americana.* Cas. Not common in spring and fall.

Jack Snipe, *Tringa maculata.* Vieill. Not rare in the migrations.

Least Sandpiper, *Tringa wilsonii.* Nuttall. Common in spring and fall.

Semipalmated Sandpiper, *Ereunectes petrificatus.* Ill. Common in spring and fall.

Willet, *Symphemia semipalmata.* Hartl. Common. Summer visitor. Occasionally breeds; nests on the ground; eggs 4; laid in April or May.

Tell-Tale, *Gambetta melanoleuca.* Bonap. Not common in fall and spring.

Solitary Sandpiper, *Rhyacophilus solitarius.* Bonap. Rather common. Summer visitor. Occasionally breeds; nests on the ground; eggs 4; laid in May or June.

Spotted Sandpiper, *Tringoides macularius.* Gray. Common. Summer visitor. Breeds; nests on the ground; eggs 4; laid in May or June.

Field Plover, *Actiturus bartramius.* Bonap. Common in spring and fall. Often breeds; nests on the ground; eggs 3 to 4; laid in May.

Buff-breasted Sandpiper, *Tryngites rufescens.* Cab. Rare.

Marbled Godwit, *Limosa fedoa.* Ord. Rare in autumn.

Hudsonian Godwit, *Limosa hudsonica.* Sw. Rare in fall.

Long-billed Curlew, *Numenius longirostris.* Wils. Rare in fall.

Hudsonian Curlew, *Numenius hudsonicus.* Lath. Not common in fall.

Esquimaux Curlew, *Numenius borealis.* Latham. Not common in migration.

Clapper, Rail. *Rallus crepitans.* Gm. Rare summer wanderer.

Virginia Rail, *Rallus virginianus.* Linn. Common. Summer visitor. Breeds; nests in bogs; eggs 4 to 6; laid in May or June.

Common Rail, *Porzana carolina.* Vieill. Common. Summer visitor. Probably breeds.

Yellow Rail, *Porzana noveboracensis.* Gm. Rare. Not known to breed.

Coot, *Fulica americana*, Gmelin. Common. Summer visitor. Seldom breeds; nests in bogs and morasses; eggs 4 to 6; laid in May or June.

Snow Goose, *Anser hyperboreus.* Pallas. Rare in migrations. A specimen was shot in Boston Harbor in July, 1862.

Canada Goose, *Bernicla canadensis.* Boie. Common in spring and fall.

Brant, *Bernicla brenta.* Steph. Common in spring and fall.

Black Duck, *Anas obscura.* Gm. Common in fall and spring. Often seen in winter, and occasionally breeds; nests in meadows; eggs 8 to 10; laid in May.

Sprig-tail, Pin-tail, *Dafila acuta.* Jenyns. Not common in spring and fall.

Green-winged Teal, *Nettion carolinensis.* Baird. Not very common in spring and fall.

Blue-winged Teal, *Querquedula discors.* Steph. Common in the migrations.

Shoveller, *Spatula clypeata.* Boie. Rare in spring and fall.

Gadwall, *Chaulelasmus streperus.* Gray. Rare in spring and fall.

Baldpate, *Mareca americana.* Stephens. Rare in spring and fall.

WIDGEON, *Mareca penelope.* Bonap. Not common in spring and fall.

SUMMER DUCK, Wood Duck, *Aix sponsa.* Boie. Common in spring, summer, and fall. Breeds; nests in hollow trees and stubs; eggs 8 to 10; laid in May.

GREATER BLACK-HEAD DUCK, *Fulix marila.* Baird. Very rare in spring and fall.

LITTLE BLACK-HEAD DUCK, *Fulix affinis.* Baird. Very rare in spring and fall.

RED-HEAD, *Aythya americana.* Bonap. Common in spring and fall.

CANVAS BACK, *Aythya vallisneria.* Bonap. Not rare in migrations.

GOLDEN EYE, *Bucephala americana.* Baird. Common in migrations.

BUTTER BALL, Buffle Head, *Bucephala albeola.* Baird. Common in migrations.

HARLEQUIN DUCK, *Histrionicus torquatus.* Bonap. Rare in spring and fall.

SOUTH SOUTHERLY, Old Squaw, *Harelda glacialis.* Leach. Common in spring, fall, and often winter.

VELVET DUCK, White-wing Coot, *Melanetta velvetina.* Baird. Common in migrations. Often seen in winter.

SURF DUCK, Butter-bill Coot, *Pelionetta perspicillata.* Kaup. Common in migrations. Often seen in winter.

SCOTER, *Oidemia americana*, Swainson. Common in the spring and fall migrations.

EIDER DUCK, *Somateria mollissima.* Leach. Common in fall, and spring, and winter.

KING EIDER, *Somateria spectabilis.* Leach. Not rare in migrations.

RUDDY DUCK, *Erismatura rubida.* Bonap. Common in migrations. Often seen in winter.

SHELDRAKE, *Mergus americanus.* Cass. Common in spring and fall; often seen in winter.

RED-BREASTED MERGANSER, *Mergus serrator.* Linn. Common in spring, fall, and often winter.

HOODED MERGANSER, *Lophodytes cucullatus.* Reich. Not common in fall, winter, and spring.

SMEW, *Mergellus albellus.* Selby. Very rare in fall.

GANNET, *Sula bassana.* Briss. Common in fall, winter, and spring, on the coast.

CORMORANT, *Graculus dilophus.* Gray. Rare in winter on the coast.

LEACH'S PETREL, *Thalassidroma leachii.* Temm. Not rare off the coast.

WILSON'S PETREL, *Thalassidroma wilsoni.* Bonap. Not common off the coast.

MOTHER CARY'S CHICKEN, *Thalassidroma pelagica.* Bonap. Rare off the coast.

GREATER SHEARWATER, *Puffinus major.* Faber. Not common off the coast.

SOOTY SHEARWATER, *Puffinus fuliginosus.* Strick. Not common off the coast.

Mank's Shearwater, *Puffinus anglorum.* Temm. Rare off the coast.

Pomarine Skua, *Stercorarius pomarinus.* Temm. Rare off the coast.

Arctic Skua, *Stercorarius parasiticus.* Temm. Rare off the coast.

Great Black-backed Gull, *Larus marinus.* Linn. Rare in winter.

Herring Gull, *Larus smithsonianus.* Colles. Common. Resident.

Laughing Gull, *Chroicocephalus atricilla.* Linn. Not common in winter.

Bonaparte's Gull, *Chroicocephalus philadelphia.* Lawrence. Not common in spring and summer.

Kittiwake Gull, *Rissa tridactyla.* Bonap. Not common in winter. Occasionally seen in spring.

Marsh Tern, *Sterna aranea.* Wils. Rare in summer.

Sooty Tern, *Sterna fuliginosa.* Gm. Not rare in summer.

Wilson's Tern, *Sterna wilsoni.* Bonap. Common in summer. Breeds; eggs 3; laid on the bare rocks in May.

Arctic Tern, *Sterna macroura.* Naum. Not common in spring and fall. Occasionally breeds; eggs 3; laid on the rocks in May or June.

Roseate Tern, *Sterna paradisea.* Brunn. Not common in summer.

Least Tern, *Sterna frenata.* Gambel. Not common in summer.

Short-tailed Tern, *Hydrochelidon plumbea.* Wils. Rare in fall.*

Loon, Great Northern Diver, *Colymbus torquatus.* Brunn. Common in spring, fall and winter. Occasionally breeds.

Black-throated Diver, *Colymbus arcticus.* Linn. Very rare in autumn.

Red-throated Diver, *Colymbus septentrionalis.* Linn. Common in fall, winter and spring.

Red-necked Grebe, *Podiceps griseigena.* Gray. Not rare in winter.

Crested Grebe, *Podiceps cristatus.* Lath. Not rare in spring, summer and fall.

Horned Grebe, *Podiceps cornutus.* Latham. Not rare in spring and fall.

Carolina Grebe, *Podilymbus podiceps.* Lawr. Common in spring and fall.

Puffin, *Mormon arctica.* Illiger. Not common in winter.

Black Guillemot, *Uria grylle.* Latham. Not rare in winter.

Foolish Guillemot, *Uria lomvia.* Brunn. Not common in winter.

Murre, *Uria ringvia.* Brunn. Not common in winter.

Sea Dove, Dove Kie, *Mergulus alle.* Vieill. Common in winter.

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* This number of Gulls and Terns may probably be increased. The species included are those known to occur by the author.

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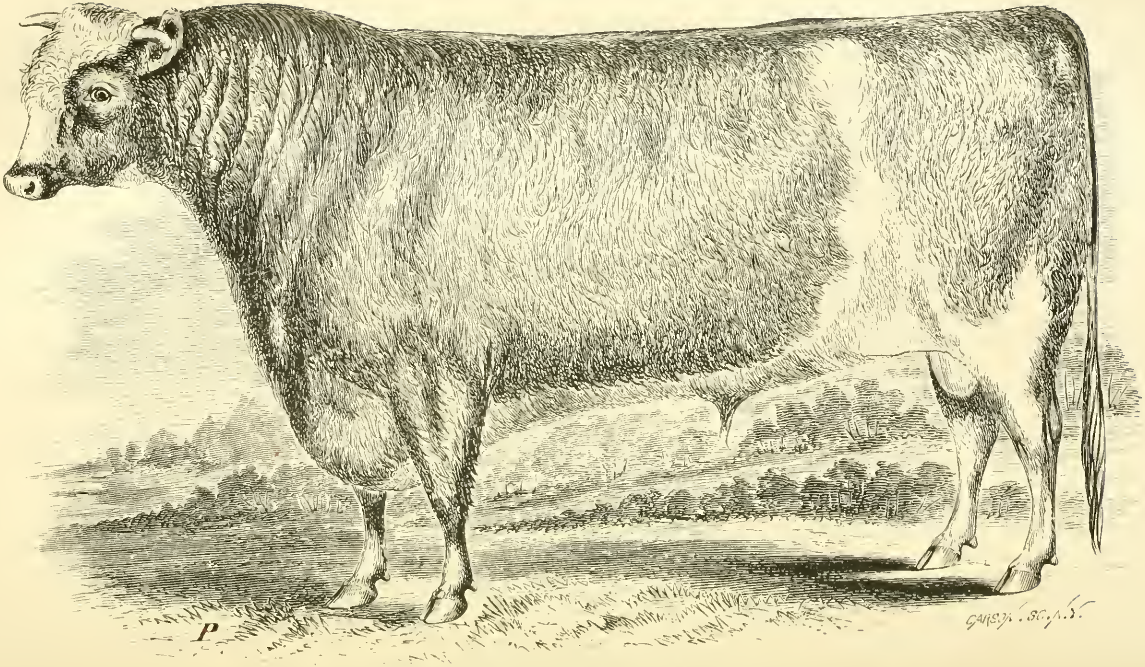

Shorthorn Bull "MONITOR." See p. 186.

# ABSTRACT OF RETURNS

OF THE

# AGRICULTURAL SOCIETIES

OF

# MASSACHUSETTS,

# 1863.

EDITED BY

CHARLES L. FLINT,

SECRETARY OF THE STATE BOARD OF AGRICULTURE.

BOSTON:
WRIGHT & POTTER, STATE PRINTERS,
No. 4 Spring Lane.
1864.

# PREFACE.

I must again call the attention of the officers of the various societies to the importance of promptness in printing and forwarding their returns. The want of it is a source of great annoyance in making up the Abstract of these Returns, and it is impossible to give a society the place and prominence which it otherwise would deserve and would have. It must be apparent that to issue this volume promptly as it is expected, it is of the utmost importance that the material should be placed early in my hands. Some of the societies failed this year to forward their printed transactions till late in March. Those of one society came in as late as the 27th of March, and of course its reports fail to appear in this Abstract.

If the legislature should see fit to withhold the bounties to the societies, it will be largely owing to the want of promptness and efficiency on the part of the officers. They do neither themselves nor their societies justice, nor do they make that return in general information for the farming community which the State has a right to expect for its money. If the difficulty of getting in the reports of committees be urged as an excuse, it may be stated that one or two societies print large and valuable transactions of some 150 pages, and place them in my hands on the 10th of December. What is done in one case can be done in another, and especially in the case of volumes of much less size.

The publication and distribution of a volume of transactions is by far the most sure and efficient mode of conferring that benefit upon the farming community which is the design in the payment of bounties, and no society that neglects this, does its duty or pays the debt it owes to the people who pay their money for the public good. C. L. F.

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## 1864.

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# AGRICULTURAL EXHIBITIONS.

The Exhibitions of 1864 *begin* on the following days:—

| | |
|---|---|
| Essex, at *Lawrence*, | Tuesday, Sept. 27th. |
| Middlesex, at *Concord*, | Thursday, Sept. 22d. |
| Middlesex North, at *Lowell*, | Thursday, Sept. 29th. |
| Middlesex South, at *Framingham*, | Tuesday, Sept. 20th. |
| Worcester, at *Worcester*, | Thursday, Sept. 22d. |
| Worcester West, at *Barre*, | Thursday, Sept. 29th. |
| Worcester North, at *Fitchburg*, | Tuesday, Sept. 27th. |
| Worcester South, at *Sturbridge*, | Thursday, Oct. 6th. |
| Worcester South-East, at *Milford*, | Tuesday, Sept. 27th. |
| Hampshire, Franklin & Hampden, at *Northampt'n*, | Thursday, Oct. 6th. |
| Highland, at *Middlefield*, | Thursday, Sept. 15th. |
| Hampshire, at *Amherst*, | Thursday, Oct. 13th. |
| Hampden, at *Springfield*, | Tuesday, Oct. 4th. |
| Hampden East, at *Palmer*, | Tuesday, Oct. 11th. |
| Franklin, at *Greenfield*, | Thursday, Sept. 29th. |
| Berkshire, at *Pittsfield*, | Tuesday, Oct. 4th. |
| Hoosac Valley, at *North Adams*, | Tuesday, Sept. 20th. |
| Housatonic, at *Great Barrington*, | Wednesday, Sept. 28th. |
| Norfolk, at *Dedham*, | Thursday, Sept. 29th. |
| Bristol, at *Taunton*, | Tuesday, Oct. 4th. |
| Plymouth, at *Bridgewater*, | Thursday, Oct. 6th. |
| Barnstable, at *Barnstable*, | Tuesday, Oct. 4th. |
| Nantucket, at *Nantucket*, | Tuesday, Sept. 27th. |
| Martha's Vineyard, at *West Tisbury*, | Tuesday, Oct. 18th. |

# AGRICULTURE OF MASSACHUSETTS.

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## ELEMENTS OF SUCCESS IN FARMING.

From an Address before the Essex Agricultural Society.

BY DANIEL SAUNDERS, JR.

How, and in what manner, agriculture may be placed in its true position, and its labors fully rewarded, are questions which interest not only farmers, but the whole community. Why is it that while success attends upon the labor of those engaged in commerce, trade and manufactures, the farmer quietly plods on year after year, accumulating but slowly; and frequently at the expiration of thirty, forty, or even fifty years, of hard work, finds that he is rewarded for all his toil with but a little more than enough to suffice for the wants of his declining years, when labor has become too heavy to be continuously carried on? Is the fault inherent in the farm, or is it in its management? Does the want of success commensurate with labor bestowed depend upon circumstances beyond the control of the laborer, or does it depend upon the absence of those elements which are conducive to success in other pursuits?

In determining these questions, another question arises. What are the elements of success? The experience of the world, and the individual history of the majority of those who have become prosperous in the attainment of wealth, and great in usefulness, answer, that success depends upon energetic and persevering labor, directed by knowledge accompanied with courage, economy, and integrity. Any man with good health and moderate mental capacity, with these elements properly combined and put into operation, may, in the long run, bid defiance to those circumstances over which his neighbor, without these qualities, has no control. And he may feel assured that he is on the highway to social position, with a competence for the present and future, if not with an overflowing abundance.

Are any of these elements, or the combination of the whole, beyond the reach of any person? Let no one answer this question for himself in the negative, until he has made a fair attempt to possess them, and failed, after repeated effort.

Labor, however energetically and perseveringly pursued, improperly directed, without knowledge, is like beating the air; and results only in an expenditure of strength without profit, and frequently in pecuniary loss. But, directed by knowledge, it yields golden harvests.

Knowledge, literally, is the accumulation of truth proved and tested by one's own experience or observation; but for the uses of life, and as the foundation of our action, it may be considered the conviction of the truth of any information which has been obtained by our own experience, or the communicated experience and observations of others. It is obtained by steady observation and practice, and to no class is this element of success more necessary than to the farmer; and owing to its want is attributable, in a great measure, the unsuccessful condition of agriculture in this State, as compared with other branches of industry. I do not here mean the want of that education which an excellent system of Common Schools affords, but I mean the want of that knowledge which is acquired only by deep thought, careful and scientific research, a knowledge which nearly all branches of business is compelled to have, in order to keep pace with the progress of the day; that mental training and working of the mind which evolves theories, and puts them to the test of practical operation.

It is a mistaken idea that, for successful field labor, merely physical training is required. Our farmers require a much higher mental culture than has heretofore been thought necessary. They know altogether too little of agriculture, as a science, and agricultural economy. They are, in their business, but little in advance of larger numbers of public men and legislators, who, neglecting to read the present and to scan the future in the light of past history, evince so little knowledge of the science of government and political economy. Agriculture has been too much left to the unaided efforts of nature to compete successfully with other branches of industry, upon which scientific labors have been abundantly bestowed. Ploughing, and planting, and gathering the crops, have been considered labors requiring but little physical, and less mental education. That the only knowledge requisite for the farmer could be obtained in youth by the annual attendance of a few weeks at school. This mistaken sentiment has kept the average of our crops far below the capacity of the soil to produce. To-day even, the proper manner of ploughing depends so much upon the nature of the soil, the circumstances of its moisture and dryness, that it is a subject of discussion.

How and in what manner to apply manures to secure the largest return, is still a subject of experiment and uncertainty. How many farmers are there who can by any knowledge they have obtained by merely planting and reaping their lands, give any accurate statement of the capacity of those lands to produce? How many know the nature of the soil of their farms, what ingredients it abounds with, and what it lacks for the successful cultivation of either cereal or root crops; to what extent rotation in cultivation is necessary; what crops should follow in rotation; what particular benefit, if any, is obtained by allowing lands to lie fallow; what is the best and most economical method of keeping pasturage lands in good condition; when is the most favorable time for harvesting grain; what the most economical manner of feeding out hay and other food to cattle.

All these are subjects of the highest importance, and should be thoroughly understood by all who own or cultivate the land. Yet upon every one of these subjects there remains a great amount of knowledge to be obtained by study, deep thought, research and experience, before they can be properly understood, and most profitably carried into practice. In fact, agriculture must be felt and understood to be a science ennobling in its study, and as honorable in its practice as it is beneficial to the human race in its results, before it can assume its proper place and sphere. So long as it is regarded as a mere industry to be learned and fully understood by a routine of physical labor, its study will be neglected, its highest attainments remain undeveloped, and its greatest treasures continue buried in the earth. But if we raise it to its true dignity, to that of an art and a science, our highest mental faculties become interested and invigorated in its study; and we ourselves become ennobled in its practice. And why may it not be recognized as a science? Certainly the ascertainment of natural laws, and their relations to each other; their physical effects in the production of vegetable and animal life is one of the greatest of sciences, and the application of these laws to the uses of man is truly an art requiring systematic knowledge, and to which men of the highest intellect may well and honorably devote their labors.

Creation exhibits the power of Omnipotence. Yet how near to creation is that power which has produced from the wild crab apple that splendid fruit which adorns our orchards; from the thorny and acrid wild choke-pear the many varieties of that delicious fruit which have graced the tables of this society; which has produced the powerful dray-horse, the fleet courser, the docile and spirited carriage-horse, from the single span which Noah took into his ark; which has produced the great varieties of useful and domestic kine from the wild cattle of Tartary, and the highlands of Scotland; which has tripled the fleeces of sheep, and which has brought into existence those endless varieties of fruits to indulge the taste, and of flowers to delight the eye. Where can limits be placed beyond which the power of man may not extend; or where is the bound which can be set to the advancement of science in the production of useful vegetables and animals, for the comfort and luxury of our race?

The Duke of Argyle, in a speech of great eloquence delivered in August last, at Kelso, before the Highland and Agricultural Society of Scotland, said: "The interest which he took in these agricultural shows was always the interest that arose from the extent to which the power of man was exhibited over the animal and vegetable worlds, in creating almost, as it were, new species for his own benefit and his own use. He would not say the power was unlimited, but he would say it was a power of which the limits were not known, because the end had not been arrived at, and probably never would be." Science, in its researches, is constantly developing new treasures and inviting to new delights in new discoveries, and opening new fields for thought and labor. Now, merely ploughing the ground, sowing the seed, and reaping the harvest, will never of themselves lead to the highest principles and practice in farming. Improvements in husbandry, as in mechanics, may sometimes be the result of accident; but are, with few exceptions, the result of careful study and deep thought. Our best and most successful farmers are reading and reflecting men,—men who know how to combine figures and how to investigate theories; who, by careful reading, have learned by the experience of others, and who, by observation, have become acquainted with the relations between cause and effect; who have studied the comparative value of the different crops, and the effect of climate and season upon the same; who have calculated the cost of cultivation, and the net profits of their productions; who, by means of study and observation, have learned not only how to save expense, but also how to increase the quantity and value of their products.

If you will but cast about your eyes, you will observe a great difference in the appearance of farms. That farms, equal in the quality of soil, and upon which an equal amount of physical labor has been bestowed, present very different appearances, examine them from what point you will. How is the difference to be accounted for? The land is the same, the labor expended is apparently the same; but yet the labor is not the same. On the one it has been entirely physical and mechanical, a labor that is apparent to the eye; on the other, there has been a labor unseen at the time, yet constantly felt in the direction which it has given to that which is seen; a labor which has made the fields greener, which has stored the barns fuller, which has improved the dairy, which has put more gloss upon the coats of the horses, and more fat upon the ribs of the cattle; which has put more comfort in the house, and more money in the pocket. This labor has been the labor of the head, the work of the brain, giving systematic direction to the labor of the hands. Here has been a two-fold labor working in harmony together, and the accumulated results are visible to the world. You need to work your minds upon your farms as well as your horses and oxen, and the one wants training as much as the other. Let your colts and steers grow up without breaking into work, and they will not be worth much when they attain their full growth, either for field or road labor; but put them to the yoke and harness young, you will find their strength increasing with age and practice, and their power made productive in useful work. So it is with the mind, if left undisciplined; its natural strength will be comparatively useless for systematic labor; but if properly trained for the work to which it is to be devoted for life, its labor will be found fully equal in productiveness to the physical labor which it will direct.

What is wanted by our farmers is an education that shall not only accumulate facts, but which shall enlarge the mind, develop the powers of the brain, widen and deepen the channels of information, and bring into operation those latent elements of mental perception and concentration. And when these powers, which every one possesses in a greater or less degree, are fully set to work in agricultural pursuits, then shall be seen our farms, gardens in productiveness, and sought by business men not only for pleasure but for profit. Then our farmers, instead of thinking their brightest and most intelligent boys are fit only for lawyers, doctors, or ministers, will give them an agricultural profession, in which they may contribute in the highest sphere of human labors towards human happiness; and in which they may acquire both honor and wealth.

But you ask, how shall this education be acquired? I answer, in the same way and manner that knowledge is acquired in other professions, arts, and sciences, by schools and colleges where a thorough and scientific education may be obtained in all those matters which pertain to agriculture in its broadest sense, to agriculture as a science and as an art. Happily our State and National Legislatures have turned their attention to the importance of this subject, feeling that for its advancement a thorough mental culture is as necessary as physical training. Congress has already made conditional endowments for agricultural education upon a permanent basis; and with a view not only to collect and disseminate useful information, but also with a view to systematize the experience of the past, to form theories, and to test their value and uses by practice, and by a thorough analytical investigation of the laws of nature, as applied to vegetable and animal life, establish safe deductions, and so to systematize and present the knowledge of agriculture, that its general principles may be within the reach of all. Some of the States have already signified their acceptance of their endowments; and I trust none will neglect to avail themselves of this great future source of wealth and national prosperity. It may not be within the reach of every young farmer to avail himself of the whole benefit of these schools and colleges by personally studying within their walls, but the light which will be shed from these institutions will be spread over the whole land, and enter the house of every farmer. The knowledge and ideas there generated, will be found in our agricultural reports, in our agricultural papers; and they will permeate through every household. The knowledge thus acquired will be observed and marked in increased prosperity; in labor saved; in additional comforts; in new varieties of vegetable life; in increased beauty and usefulness of our stock; in larger farming capital, and in better farms.

Every farmer is interested in the promotion of these schools, and to their erection and endowment he should contribute by his influence and his money, being assured that by and through them is a way to honor and profit in all branches of husbandry. Knowledge, although a power of the highest magnitude, must be used, and, in these days of rival interest, must be used with energy and perseverance to accomplish much. Energy, we all feel, is essential to the successful prosecution of any undertaking of importance; it is an element as useful to the farmer as it is to the general commanding armies. It is a trait conspicuous in every community where it exists; so much so, that frequently half a dozen active, energetic men give a character of enterprise to a village or town. If we have it, it is easily communicated to those about us and under our immediate influence. Let a farmer go into his fields with a walk and motion indicating a decision of purpose, activity of thought, and celerity of action,—his very bearing will communicate an electric shock, and will vitalize the movements of those in his employment. His very cattle will feel its influence, and his work will progress well and rapidly, without hurry or bustle. On the other hand, a man, however diligent he may be, who enters upon his work as though he had a lifetime to complete the labors of the day, indecisive as to what first requires his attention, uncertain as to what it is best to do; his whole manner, instead of infusing life and activity into those about him, enervates all their actions. And it will not require the second look at night to note the difference in the work accomplished by these two men, although the same hours have been spent by both in labor.

But it may be claimed that energy is a natural trait of character, that is exhibited only in the person of a comparatively few individuals; and what God has not implanted in the heart or brain of man, it is useless to attempt to ingraft for the purpose of growth. Undoubtedly, all men are not born equal; and the advantage which God in his wisdom gives to one of his children over another in energy of character, capacity of mind or strength of body, will be maintained through life if these greater capacities are properly used. But to nearly all God has given some capacity, moral and mental, and where natural power is weak there is the more necessity for nourishing and cultivating that power. When it will not grow spontaneously, it should receive the care which we give to exotics; energy is a power which, once rooted, will throw out branches with the luxuriance of a vigorous tree; it is a trait that may be educated and strengthened, and the more it is cultivated the deeper and broader will be its roots, until at length, instead of requiring care and nursing, it will of itself give breadth and strength to all other mental capacities. By it the resources of the mind become enlarged. The performance of arduous labors becomes comparatively easy, and work, instead of being a toil, becomes an invigorating pleasure, strengthening the muscles, giving tone and elasticity to the mind; it pulls up the stumps in your mowing fields; it makes brush fences give place to substantial walls; it drains your land, warms the earth, builds large barns, and fills them too. Little incidents in every day life attest its value.

One of the most successful farmers of this county, a gentleman educated to commercial pursuits, taking up farming as a matter of pleasure, but applying to it the energy which had assisted him to wealth in other labors, has made his farm not only a source of pleasure, but of profit also. When most farmers were suffering loss in their hay crops by the drenching rains of the past summer, his barns were stowed with sweet and nutritious hay. By keeping his lands in a high state of cultivation, his grass was ready for the scythe before the rains set in, and being ready, it was cut and cured, a large part of it in the barns. But one day, at evening, some twenty-five tons were still standing in the cock, ready to go in the next morning; but the afternoon had given indications of rain, which the evening more fully confirmed. Instead of doing as most farmers would have done, sitting down quietly, hoping that by some possibility the signs might fail, and vainly regretting that he had not began his work a day earlier, he called his men together after supper, and said: that hay must be in the barn before morning; I want you to work to-night. The men, seeing the receipts of the extra labor, and feeling the influence of their employer's energy, went to work with a will, and just as the first drops began to patter in early morning, the last load was standing upon the floor of the barn. And the next day, and the next week, the rains that with scarcely a glimpse of sunshine between the showers, were souring and rotting the mown grass of a majority of our farmers, were refreshing and invigorating his closely-mown fields, and sending up a second and luxuriant crop, while the first was safely housed in his spacious barns. Another farmer, with like energy, finding the weather just preceding the rains favorable for curing hay, employed a large extra force, and thus secured his crops by the expenditure of much labor in a short time. These are but simple illustrations of what energy will accomplish in individual instances; but this trait of character carried into the daily business of life shows its results almost as conspicuously as in the cases above related. To men possessed of energy and courage, circumstances are compelled to yield; without them, circumstances govern and control.

Courage, which commands the admiration of the masses, is considered merely that quality of the mind which looks upon physical danger with unblanched cheek and unshaken nerve, although necessary to the soldier and those exposed to great personal risk, has not been thought essential to the more quiet labors of the farm, and those civil pursuits where a well-ordered life has been supposed to be under the protection of law, and safe from violence or encroachment. Yet courage is as needful to the farmer, as to the soldier or sailor. To be sure, in his avocations he is not exposed to the danger of carrying batteries or storming forts; to climbing masts and reefing sails in a hurricane. And still of this quality our farming yeomanry are not deficient, and they will be false to their past history and their parentage when they show any lack of this element. But for all that they need a courage which I fear but few of them possess,—a courage less brilliant, perhaps, than that which has won fame for the heroes of those desperate battles which have drenched our soil with fraternal blood, and filled the land with the wail of thousands of widows and the cry of hundreds of thousands of orphans. They need a courage which will face and overcome all difficulties in acquiring knowledge; which will pay its price and test the value of the application of science to labor; which is not afraid of large expenditures in permanent improvements. A courage that will put into operation labor-saving machines; that will lay draining pipes; that will not be afraid of innovation upon farm ideas and practice. A courage that will stock their farms with the best herds of cattle; a courage that will resolutely keep pace with scientific progress in other industries.

One great fault of our farmers is, they are afraid of spending money in their business. If their farms are paid for, they think putting money in the savings bank, or letting it out upon mortgage securities, or timidly investing it in a few railroad or bank shares, the best uses to which they can apply their earnings. What would be the fate of the merchant who should act upon this principle; who should be afraid to invest his profits in increasing his business capital up to the wants and capacity of his trade? Without increasing his capital, he might continue to do a safe and limited business; but the luxury of great liberality, which wealth rightly used affords, would never be within his reach, and we should have neither princely merchants, nor merchants with princely fortunes. Without business courage, the stage coach would never have given place to the swift and commodious rail-car, nor would steam have held its direct course upon the ocean against wind and tide. Where is the farm in our county that has been made to yield to its full ability? Where the farmer to-day who cannot make improvements that will pay more than six per cent. upon the money needed for such improvements; and which, at the same time, will stand as the best of securities for the capital invested.

In this connection, I may speak of economy, which is never allied to parsimony. The two are antipodes with each other, as well in practical operations as in lexicographical definition. The one means a judicious use of money expended to advantage without waste. The other a wasteful hoarding by saving necessary expense. Economy would stop the leaks in the roof before the rains had damaged the plastering of the walls. Parsimony would wait until the crumbling of the plastering required the services of the mason as well as of the carpenter to return the house to a habitable condition.

Liberal and judicious expenditure in promoting any business is generally the greatest economy that can be practiced, and this holds good with the farmer as well as with the mechanic, the manufacturer and the merchant. A man who pursues a niggardly and parsimonious system with his farm, has no reason to expect that his farm will yield to him bountifully of its products. It won't do to starve it, and then expect it to do the work of one that is strong and well fed. It is no use to expect a farm to thrive on mere husks; the storm-beaten and sun-dried excretions of cattle thrown out of a hole in the side of the barn, exposed to the alternate drenching of rain and scorching of the sun, will not satisfy the natural cravings of the soil; and however strong may be the constitution of your land, you will find it in the end getting low and weak on that kind of diet. It will then require strong stimulants to keep it at work up even to a moderate production. It is pretty poor economy that will stint good land until it becomes so weak that it can hardly hold up a ton of hay to the acre; yet in Massachusetts the strength of the land has been reduced by this kind of management so that the average yield of hay is less than a ton per acre. This kind of farming is not the kind that pays large wages to the laborer or a high rate of interest to the capital invested. Economy requires that your lands be kept in good heart, improving in quality year by year. To do this, if you sell hay, you must purchase manures; if your land is wet, you must not be afraid of the expense of labor and material to drain it; if it is cold, you must warm it with stimulants. All this takes money, and money thus expended, even in large amounts, is good economy, and in the end the investments will pay large dividends.

If our farmers owning their lands in fee, had half the courage of some of the tenant farmers in Europe, we should see a vast difference in the looks of our fields; in the size and number of our out-buildings and barns; in the number of cows in our yards; in the weight and condition of our market cattle. Then agriculture would not be so far behind manufacture in profits and general success. It was said by the Duke of Argyle in the speech before referred to, "That no country in the world had advanced so rapidly in the science and practice of agriculture as Scotland, during the last century; and that had arisen from the industry, enterprise, and expenditure of capital of its tenant farmers. The capital of great mill owners is always to be seen in their great factories, warehouses, and their machinery perpetually in motion,—all of which strikes the eye. Whereas the capital of the tenant farmer is literally buried in the earth. In a work upon agriculture of the two great border counties of Roxburgh and Berwick, I find that on one farm the tenant had expended in the first three or four years of his tenancy £9,000 in draining and artificial manures, and on a farm of less extent, another tenant farmer had expended £5,000 in a similar manner; and unless these men had been confident that in the course of their leases they would have got their money back with interest, they would not as Scotsmen have so spent their money."

As an illustration of what courage and energy, directed by scientific knowledge, will do in the cultivation of the soil, I need but refer you to the well known Tiptree Hall Farm, of Essex County, England, the property of Alderman Mechi, of London, who, some twenty years ago, purchased about one hundred and thirty acres of barren heath land, supposed to be worthless for the purpose of agriculture; but with an industry and an amount of capital expended that would frighten many of our boldest business men, he has converted that barren waste into fields unsurpassed in richness, and wrought it to such a state of productiveness, that he is now annually in receipt from it for all his capital invested in the land and improvements, nearly three-fold the rate of interest then paid for the use of money. For a brief description of this farm and its wonderful improvements under the direction of its bold and successful owner, I would refer you to the statements concerning it, made by the Secretary of the Massachusetts Board of Agriculture, as contained in his interesting report of his visit to Europe in 1862, a report well worth reading, both from the pleasure and profit that may be derived from its perusal.

It is not to be expected that our farmers, generally, can as yet compete in wealth, or the ability to make improvements, upon the same scale with the rich farmers of the best portions of Europe, and for the very reasons that our farmers have not for a long series of years given the same importance to farming that European farmers have ; they have not applied the same energy and talent in this business which they have done. Other branches of industry have been more attractive in this country. Fortunes acquired by bold and successful dashes have so captivated the imagination of our young men, that they have rushed from the slower and more quiet routine of farm life into the whirling eddies of speculation and trade, out of which they hope to emerge with wealth sufficient to return once again to the old homestead, where they may enjoy their fortunes in the peaceful retirement of rural life, outside of the bustle and tumult by day, and the anxious thought by night, which constantly abide by the man seeking riches with hasty steps.

Let our young men be content to apply to the farm the same energy, the same zeal, the same labor, the same learning, which they are willing to devote to the more hazardous business which now engrosses the attention of so many of them ; and although they may not reap wealth so abundantly as some of the neighbors engaged in other pursuits, yet they will find less disappointments. There will be fewer upon whom fortune will frown, and many more who will obtain that competence which suffices for all needful wants, and sufficient for a generous liberality. Nor will the other branches of trade, mechanics, commerce, or manufacture, suffer by increased attention to agriculture. Thrifty agriculture will demand more labor-saving machinery, better farm implements, more manufactures of all kinds, induce emigration from the overstocked population of the great cities of other countries, and will give increased impetus to all business ; for upon agriculture all other business is based and supported.

Upon the subject of integrity, as useful and necessary to prosperity in our mutual dealings and transactions with each other, I need not dwell. That honesty, in the long run, is the best policy, is a truism which has been established by the experience of ages; and amongst our farmers and in the rural districts, this virtue is of natural growth. But care should be taken that it does not become choked by vicious weeds. It is a principle which applies alike to the farmer, the merchant, the shoemaker, and the statesman. It applies alike in time of war as well as in time of peace; it applies alike to governments and to individuals. That all is fair and honorable in war and politics, is a maxim founded in barbarity and dishonesty, and will never lead to permanent honor and success. Shoddy contractors may practice it, and fill their pockets with ill-gotten gains; they may glitter in the tinsel which gold will purchase, but the contempt of an honest people will cover them with shame. Mere politicians may arise from obscurity for a while to position and place by its secret machinations, but their policy followed to the end will invariably lead to disaster not only to themselves, but to a people controlled by their counsels. Integrity is that wholeness of mind which contemplates the entire extent of our obligations, as individuals, in our mutual relations one to another; and as citizens in our relations to society and to our country. It does not simply require us to abstain from over-reaching in trade, from taking advantage of the ignorance or confidence of those with whom we contract, but it also requires the performance of every duty which we owe to our families, our neighbors, and the community at large.

First as to the duties we owe to our families. Conjugal, parental, and filial affection would seem to be a sufficient incentive to the full performance of every duty at home. Home happiness is the highest of all enjoyments, and he who fully possesses that is truly a successful man. Yet how many there are who have never realized the full enjoyment of this success in life, from inattention alone, when little care and forethought would have sown seed, the harvest of which would have been abundant happiness.

Our farmers rise early and toil late; they look after the comfort of their cattle; they give them food and good shelter; their horses and oxen receive early training and education for the labors they are to perform. How many are there who give their families none. Of affection there is no want; of real, heartfelt love there is no lack. But of sympathy, of interest in those little things which make the daily life of each member of the family, there is a lack of expression which prevents the members from fully entering into the enjoyments, or appreciating those little perplexities of each other which, to say the least, if it does not cool, renders less cordial the home relations. Parents, perplexed with care and labor, are apt to forget that amusements, wholesome and rational, are essential to the child, as well as food and clothing; that if amusements are refused them in childhood and youth, dangerous follies will most frequently be sought and explored in early manhood, when paternal restrictions are removed. Let parents fully appreciate all the necessary wants of their children; enter into all their little joys and griefs, participate in and give direction to their innocent amusement, and they will find the child drawn to them with bonds of the strongest sympathy; and that these amusements not only give pleasure for the hour, but elasticity and strength to both mind and body for the labors of life.

Let the husband, by little attentions, anticipate the wants of the wife, and he will find a light in the house more cheerful than the blaze of fire upon the hearth in a winter evening. Let his garden be well stocked with the various fruits for his own table, and his yard with flowers, he will find that it requires but little to interest his boys and girls in their cultivation and improvement, and that health and pleasure will more than pay the cost. Let him look carefully to the education of his children, not trusting to others' oversight alone those matters which most concern their future welfare.

Let him interest himself, personally, in all that pertains to the household, not expecting that the house and its inmates will provide for its social happiness without his supervising care. Then will he appreciate the blessings of a dutiful family, and as his children grow up he will enjoy the conscious satisfaction that he is leading them in the path of usefulness, to honor and respect of their fellows.

To our neighbors we owe reciprocal kindness, in word and action. These duties are so various, and yet so patent, that the words " good neighbor " cover them all. They require the building of school-houses for the mental training of the young; of churches where the doctrines, precepts and religion of our

Divine Redeemer may be taught and expounded. They require social life and interest—an interest that shall lead to action in all those matters which benefit a neighborhood.

What do you imagine would be the condition of our Common Schools, compared even with their present high standard, provided every individual in his district took and felt that interest in the subject of education which its importance fully demands,—if the school meetings were attended by every one having a right to act therein, with the sole purpose of promoting the welfare of the rising generation ?

Any district which would act up to the extent of this principle, would soon find itself conspicuous in educational reports ; and the performance of all obligations resting upon a neighborhood would soon place that community in the highest position in point of happiness and general prosperity.

The duty which we owe to the country is peculiar to us, differing, in a great degree, from that of other nations. With us, the aggregate recorded expression of the will of the people is the law of the land. Every man should assume the responsibility of giving expression to that will, according as his reason and judgment directs, uninfluenced by partisan passion or prejudice. He should be ready at all times to yield his opinions when they are not supported by reason and experience. The theory of our institutions, that the people are capable of self-government, can only be sustained upon the basis of enlightened judgment in the expression of popular sentiment. Therefore, while we have the right to direct, by means of the ballot, the policy of our government, so grave a duty should be performed advisedly, upon due consideration of all arguments that can be brought to bear for or against that policy ; otherwise political action would be but a blind impulse of the passions or feelings leading to unswerving opposition, or unconditional support of men and measures. It is the duty of every patriotic lover of his country to assist in moulding public sentiment in a right direction,—to counsel obedience to law, knowing that only by means of a sound and stable government, supported and controlled by constitutional law, can he enjoy the fruits of his labor, or find protection in his property or person.

We should require the enactment of just and wholesome laws, and while seeking their protection or enforcement, should ourselves give a ready obedience to the same. We should respect the dignity of office, and render all loyal aid and assistance to those who administer the affairs of the nation. And at this time, when civil war is shaking the pillars of our government to their very foundations, and while the ship of state is battling in storm and tempest with billows lashed into fury by sectional animosity and hate, he who refuses the aid of his lips, of his arm, and of his heart to those who hold the helm while directing the ship aright, and he who withholds his warning voice when breakers are seen ahead—are alike foes and traitors to their country.

In this great ordeal through which our country is passing, every man has a duty to perform. Justice to his family, to his neighbors, to his country, and to his posterity, alike demand performance, however great the sacrifice may be. Rebels in arms must be taught to respect the sovereignty of law, and the power of constitutional government, and when obedience shall be enforced, or yielded, then it will be our duty to show that clemency is the attribute of greatness,—that no bond of union is half so strong as that which is riveted with love and fraternal feelings.

When that time comes, then shall we have an honorable and permanent peace, in which plenty shall rejoice the husbandman, prosperity bless all classes and sections of our common country, and the gratitude of a nation shall keep green the memory of its living and fallen heroes. Then shall we emerge from the calamities and dangers which now beset our path with a strength to vindicate our rights at home and abroad—with power to rebuke foreign interference and to maintain the policy of our republic in the face of the world.

# THE MODEL PRODUCTIVE STATE.

An Address before the Worcester Society.

BY ALEXANDER H. BULLOCK.

The great and thoughtful poet, whose life had witnessed alternately the tranquillity and the convulsion of nations, has passed down to us in beauty of language the acknowledged proverb—

> —"peace hath her victories
> No less renowned than war."

It is to the contemplation of these that the season and the occasion invite us. At a time when the strains of martial music and the tramp of armed men are the sounds that most interest us, it is well that we have assembled to celebrate the achievements of labor and the useful arts, without which, fully appreciated and vigorously prosecuted, we should be unable to carry on war with success or to retain the lustre of our arms. Neglecting our internal resources, omitting to develop and strengthen the State as an industrial power, we should be without the martial spirit and without the ability effectively to defend the government. The great master of Europe, the first Napoleon, when he was levying fearful conscriptions upon his empire to bear her victorious eagles over the Rhine, was almost equally intent on encouraging and stimulating her industry at home,—thus holding good alike the resources of his country and the patriotic affections of his countrymen. Massachusetts does well to imitate the example. This society has done well, if to the maxim, honored by time,—in peace, prepare for war—it has not forgotten to add as the counterpart,—in war, still cultivate the arts of peace.

That which would now be regarded as the ideal of a productive State, cannot be found in any of the conceptions or in any of the realizations of the past. In all the active elements of public prosperity, within the period of fifteen years a change has passed over these American communities, such as had not been witnessed in the lapse of a century before. I cannot mean that agriculture has lost any of its importance,—that were impossible,—but it has undergone changes in its relations to other pursuits, it has varied its own forms and forces, and especially has it felt a new class of stimulating influences which were altogether unknown in the preceding ages.

It is now nearly three hundred and fifty years since Sir Thomas More published his sketch of a perfect community, his ideal of a State, his classical Utopia, in which the pursuits of that imaginary and quite happy people are described as consisting almost entirely of the labors of husbandry, varied, it is true, by a few of the simpler and ruder styles of mechanical industry. And though the pleasing romance is only a romance, yet we should find upon examination and comparison that the fictitious Utopia, written more than three centuries ago in Latin, and soon after transferred as a classic to our language, comprises most of the elemental divisions of human employment recognized in history before the close of the last century. Any person who will take up a copy of one of the early geographies formerly used in the schools, and read its brief statement of the products of Massachusetts, or who will follow the history of the State from its origin down to the opening of the present century, cannot fail to observe "the short and simple annals" of its productive departments of labor. Within the recollection of some who hear me the spinning-wheel was found in nearly every dwelling, the loom in many,—and as the historian exultingly informs us, the wives and daughters of the farmers of Massachusetts took pride in the fabrics their own industry had created, and were clad in garments wrought by their own hands. Of the males above fifteen years of age the great majority ploughed the earth ; a few ploughed the sea. But all that variety and extent of our power which we now express by the mention of our manufactures, had not yet awakened to life ; and whatever of the useful arts existed at all, were to a considerable extent incidental occupations in the farmer's household. The genius of invention and discovery had begun somewhat earlier, it is true, to unlock to some of the countries of Europe the motives and stimulants which have since revolutionized human life, but the effect had as yet been scarcely felt on this side of the water. A few struggling attempts at manufactures, —small investments and still smaller returns,—had only the influence to hold up to the gaze of an agricultural people the isolated experiment and the signal failure. We have but few official statistics of that period. We know that there were fisheries, bold and hardy,—a commerce, sagacious and forecasting the future,—mechanic arts, limited in their scope and absolutely feeble; but in the main, in all the State, it was agriculture, not studious of improvement and intensive in its experiments and trials, as agriculture now is, but dormant, inert, and plodding its way unawares towards the better condition that awaited it. Men scarcely perceived the star of the social destiny that hung over them.

Such was the situation of our domestic industry, within the memory of some of you, and prior to that division of labor and separation of employments which now imparts to it such majestic power. At that time there were but fifteen cotton mills in the United States, working, it is said, about eight thousand spindles —or one-fifth of the number that are now operated under a single roof in Lewiston, or Lawrence, or Sprague; while, of the long and diversified list of labor now returned by the assessors to the Secretary's office, not one item in ten had even an existence. Such was the former state of things.

But the present generation is living under a new, and you will not refuse to concur with me, under a better dispensation. This is the era of the organization and classification of the occupations of mankind. The ideal of a State is no longer one whose population, whether on the Merrimack, or on the Connecticut, or by the side of the sea, is disproportionately engaged in agriculture, and therefore without that variety of pursuit which furnishes the wholesome adjustment of demand and supply. That is now regarded as a State of high and complete development, whose people find the most varied and profitable employment; whose producing capacity keeps pace with its consuming capacity, its production always suggesting and supplying its consumption, and its consumption at every stage of increase exciting its production; thus maintaining within a laboratory of demand and supply, and carrying on without a free and profitable exchange of products that blesses alike those who give and those who take; not impoverished whenever a single staple shall fail or shall not be wanted, independent alike of a surplus around the Caspian or of a famine in Ireland; generating new forms of want, (for he who creates a new want is a public benefactor,) therefore opening the way to new modes of labor, and interlacing the social system with a network of mutually dependent interests and classes; saluting the buyer and seller of other States with the symbols of its commerce; musical in all its borders at home with a machinery which in constancy and power transcends even all human hands; and finally, holding all the ranks and all the departments of our social being in full sympathy with an intelligent and vitalized AGRICULTURE, which furnishes to them all the breath of life. Such, I venture to state, is the form and presence which labor takes under the highest development of our civilization. Such a condition is the result of so simple a cause as the classification and separation of the occupations of men, initiated in the first instance in Europe by the introduction of the useful arts, and already become the striking feature of our own community. Great Britain undoubtedly occurs to us as the most perfect example and illustration of this policy of States, while, if we were searching for the nearest approximation to such a model in this country, I suppose we should be authorized in accepting the judgment of our neighbors and naming our own Commonwealth.

The published returns of the productive labor of Massachusetts give a result of more than three hundred millions of dollars in value, turned out annually from her fields and workshops. This volume of profitable industry surprises us by its vastness, and it is only justly appreciated and understood when we consider that it pours in from a thousand rills through all her valleys, and rolls on at last to the ocean of aggregated human life, proceeding first, last, always, and all of it, from free, intelligent, divided labor. Let us bear in mind, however, that of this vast and varied product of Massachusetts, three hundred annual millions, only one-eighth part, or less than forty millions, belongs to agriculture. Neither do I speak of this in any spirit of depreciation, nor is this by any means an inconsiderable amount. On the contrary, we may justly reckon it the brightest gem in the coronet of our industry. Though the agricultural department in the State is still far from that degree which will satisfy either our policy or our necessity, and though these figures do not place us by the side of the large grain and stock growing States whose almost entire population are employed in the cultivation of their rich virgin soil; yet, when we consider our limited area, our soil not the most permissive of culture, and the small proportion of our farming people, and especially when we consider the great expansion of the other departments of our production, we have abundant cause for gratitude to a beneficent Providence which from the chill-smitten clods of this little patch on the map of the Union has enabled us to extract so large and so rich rewards.

Nor do I forget that in this array of the products of agriculture the county of Worcester contributes a large and honorable share. Her exhibitions of stock have usually been regarded as foremost among her sister societies. I find by analyzing the returns, that in the value of horned cattle this county is in advance of all others, being equal to Essex and Middlesex combined; that in the product of the dairy she exceeds the same two great counties united, and has only Berkshire for a competitor; that in corn she stands before all, though alluvial Hampshire follows closely in her march; that in oats, Berkshire alone comes within hailing distance; that in potatoes no other county ranks her, though Middlesex is not far behind; that in the root crop she yields largely to Middlesex and somewhat to Essex, but to none other beside; that in hay she is vastly in the ascendant over all; while in the various fruits she has but one equal. Worcester as an agricultural district is peerless in the State. And I do not overlook another fact, comprehensive of all the others, crowning the qualities of an agricultural people, that the farmers of Worcester, have a reputation well-earned and widely known for their liberality and freedom from prejudice in the introduction of trials, experiments, and modes of culture, and for their readiness to co-operate in whatever is designed to advance the general welfare.

And yet I must remind you that largely as the county is agricultural, furnishing one-quarter of the products of the land of the State, even her industry is but partially in the cultivation of the earth. This county made returns eight years ago of an annual product of her labor of $41,000,000. But of this flattering result, if we examine the tables with care, we shall find that less than one-fourth part can be set apart as belonging to the department of agriculture. All the great residue is distributed over the wide range of diversified industry which belongs to manufactures, the mechanic and useful arts. How much of mystery or of instruction is borne in this view of the subject, you shall judge, when I summon before you the State returns of 1855, which exhibit the entire agriculture of the county as $9,250,000, and at the same time call before you the census of the United States for 1860, which reveals a product of boots and shoes in the same county of $9,500,000. I might present other illustrations derived from an hundred specified forms and classifications of our labor. So fully has Worcester partaken of the spirit of Massachusetts enterprise which reflects the decrees of Providence and the resolution of a sturdy people, blending in the promise that whatever the brain, and nerve, and muscle, of free, intelligent labor can accomplish,—whatever taste, and art, and skill can impart,—whatever all the high qualities of man or the finer perceptions of woman can add,—all shall be contributed, as all have been contributed, to make this little Commonwealth to those who have their abode in it, the happiest home in all the earth.

I return now to the fact, already perhaps sufficiently illustrated by the bare mention of our published returns, that our State is a scene of diversified and classified industry. Agriculture is indeed a large interest,—the primal and essential interest, without which there were no life to any other;—but, after all, in our political economy it is but one interest in many. All these pursuits are part and parcel of a common welfare and a common destiny. All together they constitute the charmed circle from which no segment can be spared without disturbance and detriment to the whole. And as a part and a consequence of this complex yet simple social condition, agriculture both in Europe and New England has been steadily enlarging the sphere of its powers. As English and American publicists have been compelled to admit, the recent development of the earth's culture may be traced to the quickening influences which the use of machinery and the methodical division of labor have exerted upon the population, the industry, and the consumption of nations. In the Natural History of Lord Bacon, written an hundred and fifty years before a jenny or throstle had been set to music, the intelligent student may find agricultural science enough to supply the consumption of the time. That which was wanted to awake empires from their rural sleep, was not so much knowledge to guide, as a reorganization of pursuits to stimulate the inert and flagging energies of labor. This great object began to be accomplished near the close of the last century by the invention of labor-saving, labor-creating, and labor-dividing machinery. By these agencies the industrial reformation of the world was secured. Since time commenced there has been no such illustration of this truth, as is found in the growth of the industry of Great Britain within the last seventy-five years. Prior to 1766 her population, industry, and consumption had for a long period remained stationary. But about that time a series of inventions and constructions in mechanism opened, which have shed a lustre upon the power of the race, and made the epoch in which they occurred memorable in history, and in no respect more marked or visible than by its effects upon agriculture. This procession of events began with the introduction of the spinning jenny brought out by Hargreaves, and was followed by Arkwright, and Crompton, and Whitney, and by the efforts made all the while by Watt to extend the application of steam to the movements of machinery. The introduction of these machines and their associate accompaniments upon the theatre of labor, at such a juncture, appears to have been one of those providential interpositions which sometimes change the direction and destiny of men. There had been a pause in the industry of Europe, awaiting some stimulant to production and consumption, which always act with reciprocal beneficence upon each other. And the new world beyond the main was then passing on to independence, to the assertion of her own forces on the land and the sea; and precisely what was wanted, was a higher and larger application of the useful arts,—a new enginery,—a new class of impulses,—to unfold her career. The result has been accomplished in both hemispheres. In Great Britain, under the impulse imparted by machinery and the more perfect division of labor which followed, the public industry was raised as if by enchantment. In thirty years the productive forces of the kingdom were tripled, and the country mounted to an elevation of independence which has thrown the other parts of the world into the shade. And on this side of the water the uses of machinery and the separation of the different processes of labor into distinct employments have brought similar results; and nowhere more apparent than in our own Commonwealth, where the development and expansion of the system has been already expressed by the secretary's abstracts to which I have referred.

This lesson of the diversity and unity of our industry suggests for our appreciation a just and generous idea of labor. And what is labor? It is profitable action; it may be merely manual labor, or it may not be; it is attention; it is business; it is employment. That is labor. Here in Massachusetts are three hundred and fifty thousand males over fifteen years of age, of whom only one-seventh, or fifty thousand, are returned as farmers, and about as many more under the head of laborers. But I pray you not to suppose that all the rest of us are drones in this Northern hive. On the contrary, there is not a class nor an occupation which could be spared from its place in this imperial arch of our social organization. There is no room in the field of modern enterprise and modern philosophy for the obsolete theory of certain political reformers who write down under the title of non-producers all such as do not directly and with their own hands work their food and clothing out of the earth. The returns of Massachusetts furnish a broader and more catholic construction than that. The mechanician, who facilitates or increases the efficiency of the producing capacity of society; the manufacturer, who furnishes the clothing and conveniences of life with dexterity and cheapness; the merchant and tradesman, who acts the part of a time-saving and money-saving agent in the exchange of products and values; the agents of currency, who enlarge the facilities of the merchant through the stages of realizing the returns and equivalents of trade; the man of inventive thought, who shortens, or cheapens, or eases any of these processes from one occupation to another; in short, whoever, and under whatsoever name, steps in between these employments of men, and by reducing the time or cost of their interconnection makes himself a link in the chain that binds them all together,—though the flesh upon his bones and the raiment upon his back have not come immediately to him from the sweat of his own toil upon the land,—is nevertheless to be reckoned an agent in the complicated economy of production, and is therefore in a just and an honorable sense a producer. In name and classification, the agents of production are one thing, and the agents of distribution are another ; but any part and any action that facilitates the progress from production to distribution, invests the actor with a claim to the rewards of labor, and with a title to the name of a laborer in the solemn vineyard of the world. So true is it that in all this diversity of occupation that covers the State, there is unity of design,—harmony of origin, harmony of relationship, and harmony of destiny. This, then, is a lesson of the hour and the place,—the more thorough the classification of labor and the separation of pursuits, the more complete will be that unity and harmony which pervades all the functions of production, exchange, and consumption, and which will bear us onward to the realization of the happiness of social existence.

Such, gentlemen, such *is* labor in Massachusetts. Its achievements are before you. Combining the silent forces of a divine chemistry with the works of man, it has unmasked the surface of the state of rock, and bog, and forest, has reinvigorated its reluctant soil, stirred into life all its dormant virtues, and encircled it with the emerald girdle of June and the golden plumage of October. It has summoned into its workshop those benefactors of the generations of mankind, the masters and authors of reformatory art. and invention whose names I have already pronounced, all the procession of their compeers and followers,—has set in motion the enginery of the creative mechanism of eighty years, the most precious years since the birth of our Lord, from the leviathan that shakes the earth with its awful vibrations to the delicate pulsations of art that rival the beat of a parlor clock,—and in their magic presence the raw materials of every clime, despised in the ages past but now brought forth to beauty and glory, have departed in mystery from their natural state and have reappeared in the myriad forms and instrumentalities of a living economy. Next, supplying another class of necessities itself has created, it has made other conquests over the elements and terrors of nature,—and all the metals of the earth, air, water, steam, the lightnings of heaven, have been transformed into the winged agencies of its commerce. Then, having responded to every material want, having sheltered, clothed, and fed a people with a liberality witnessed in no period of the world before,—it has filled the State with the higher proofs of its affluence, has erected the lofty temple, established houses of learning, commemorated the passing generation in historic art, embellished the town and country, and with the ceaseless tide of a moral irrigation has enriched, ennobled, exalted the Commonwealth.

This is our system. This is our epic,—so much better than that of the days of dream and song. Many of you remember to have read of the fabled river Pactolus, in which Midas bathed,—and its waters were ever after rich with gold. Modern labor,—organized, classified, educated—has all that Midas touch, and rolls golden sands to the sea. Not a trout brook in Massachusetts, large enough half the year to evoke the music of a lathe or a spindle, that has not more than the virtues of that Phrygian stream. Cast your eyes, men of Worcester, over these waters that flow through your teeming intervale,—behold them merrily but steadily at their work,—when exhausted, reinforced by the engines, little and mighty,—all directed and controlled by the heads and hands of intelligent, independent, free men,—follow the river to its mouth and bring back the census of its labor from its confluence with the Narragansett; reflect that this is but a representative of every stream in New England over whose haunts the spirit of American enterprise has asserted its authority, and tell me if the ancient fable has not become modern fact, and Pactolus been transferred to our own slopes and valleys. Nor quite that literally, but a little better than that, Mr. President. The golden river of New England, wherever you find it, differs considerably from that which is traced on the map of mythology. I claim for it in full the eulogium which the smooth numbers of Denham bestowed upon the Thames:—

> "Though with those streams it no resemblance hold,
> Whose foam is amber, and their gravel gold,
> Its genuine and less guilty wealth t' explore,
> Search not its bottom, but survey its shore."

Having thus considered, imperfectly for the theme, but sufficiently for your patience, how impressive is the universality of our industry, how essential to the common welfare is its unity in diversity, permit me to pay a momentary but parting admonition to the necessity of a large agriculture. We have in Massachusetts about the same proportion of persons engaged in the cultivation of the earth as is returned by the English abstracts; and the smallest extent of the products of the land which would be proportionate to the magnitude of other departments, should be, not forty millions, but an hundred millions. The agriculture of the State has every inducement for a larger development, which can be derived from the most minute organization of its industry, and from the most complete expansion of its powers of consumption. And the time has now come when manufactures and trade will require but little further encouragement,—they will take care of themselves,—but it is agriculture, it is agriculture, which must achieve higher advances, or degeneracy will begin its work. If we expect to maintain the position we have acquired in the community of States, or to hold unimpaired the adjustment and symmetry of our social character, we must preserve in its full vigor the element of an agricultural population,—responsive to the growth of other departments, and irradiating the future, as it has irradiated the past, with the lustre of its patriotism and integrity, its sobriety and frugality, its virtue and religion. And especially in the present epoch of uncertainty and change, when the gilded prizes of trade so frequently crumble to ashes, and the riches of skill and art so easily take to themselves wings, let us hope that the fifty thousand farmers of the State will hold fast to their profession,—that they will remain themselves, and that others will join them in the safe and serene paths that were marked out by the Divine hand in the beginning of all things. With a Commonwealth thus organized and classified,—the masterly energies and comprehensive grasp of its manufactures, and arts, and commerce, resting on the pure and solid base of an unfailing and increasing agriculture,—and all blending in the culture of those charities which impart even to present life a beneficence that is imperishable,—we may fondly hope to repeat, in our experience from year to year, the happy and lofty climax of the poet:—

> "Man is the nobler plant this realm supplies,
> And souls are ripened in these Northern skies."

Fellow citizens of Worcester, to such a condition the State has attained under a long reign of industry and peace. Hitherto we have assembled at this season of the year to commemorate these results under the happy auspices of domestic tranquillity, —under the silver horn of the harvest or the hunter's moon,—looking forward to nothing more exciting than the greetings of Thanksgiving or the vespers of Christmas. But the resources and treasures of this political and social system are now brought to the test of a new call and a more solemn consecration. The life of our government is in peril; it has been in peril through three afflictive years, and let no man lay the flattering illusion to his heart that it is yet by any means out of peril. And the problem is thrown upon us to solve, whether in these cultures and prosperities the qualities of a sturdy stock of MEN have become diluted and lost, or whether the traditional and historic prestige still abides in our hearts, and we will rise, ourselves and our resources, to the greatness of the exigency. There can be no doubt as to the solution of the question. This industrial system, which has poured imperial riches into the lap of the State, has also been the school and discipline of character. It has made the Commonwealth the theatre of manly action, and high enterprise, and heroic purpose; it has inspired the hearts of her sons with generous hope, and triumphant faith, and patriotic affection towards that radiant flag which is the symbol of their success and glory. Such a people may be safely trusted, not only to take care of themselves at home, but to hold out in defence of the public liberties. Sustained and invigorated by such a system of industry, exercised in every form of toil, practiced in every department of skill and art, the people of Massachusetts are able, as they are willing, to defend the government which has so long protected them, and they will defend it, henceforth and forever. They have learned the value of this Union,—which has developed their resources; which has reclaimed and fertilized their lands and erected workshops on a thousand water-falls; which has rewarded their labor with the largest profits and with the highest honors; which has made their homes the entrenchments of plenty and frugality and virtue; which has associated the graves of their ancestors with the treasured memories of the Revolution and the Constitution; and they send their sons and brothers, they go forth themselves, to defend that Union against the foulest of all rebellions since the revolt of the angels. I invoke you, Mr. President, and the members of this honorable society, amid the proofs of the value of government which are furnished to-day in the victories of Labor and the Harvest, to consecrate them all, if need be, to the higher victory of constitutional government and constitutional liberty. And if the time shall come when this Union must perish before our eyes,—which Heaven forbid! which Heaven, inspiring the value of our arms, does forbid, and will continue to forbid!—then, here, in the fields and villages of Massachusetts,—where republican government, tempest-tossed from the old world, disembarked on the new,—where the virtues of the fathers have not been engulfed in the wave of a luxurious civilization,—where the armorial ensign of the Puritans still floats, emblazoned with the mingled watchword, LABOR and LIBERTY,—even here, amid her pines and oaks, the spirit of the Constitution, which is the spirit of freedom, shall find one refuge more and breathe its last sigh on the bosom of its last friend.

# NEW ENGLAND FARMING.

From an Address before the Worcester North Society.

BY LUTHER H. TUCKER, OF ALBANY.

We find the New Englander the inheritor of a land, resting on a sure foundation indeed, but one that *out-crops* somewhat overmuch for purposes of tillage,—of mountains and hillsides around which the pure air of Freedom must ever play, and that more readily than plough or reaper,—of streams quite as favorable often for mill-sites as for meadows,—of a season devoting almost as long a period, to the great delight of young people certainly, to sleigh-riding, as it includes from the sowing of spring grain to the gathering in of harvest—in fine, that he has ample scope for all the perseverance of his Puritan descent, in the effort to transform this unwilling heritage into civilized farming land and deep-soiled gardens. River valleys there are, rich enough it is true, and as beautiful to the eye of the agriculturist as to that of the artist. But the sea beats on ruder cliffs, and the waters of the rivers come down from less fertile highlands. How many brave men and frugal matrons, what lives of toil and patience and abiding faith, *these* have nourished —farmers, whose brains were in their work—farmers' wives, who *clothed*, as well as fed, husband and sons—families brought up in the fear of God, schooled, and started with this double capital of honesty and the rudiments of practical knowledge to re-enact their fathers' parts, or to take parts of their own, as strong arm and active mind might guide the way—filling counting-house and pulpit and legislative hall, planting cities, influencing the destinies and brightening the hopes of nations! No vine trembles under its purple clusters, just ready for the wine press, in this clear autumn sun: under your summer breeze, no broad levels have waved, mile after mile, their billows of ripened wheat; no perennial verdure shall clothe your fields while the full year completes its round. Nor have those other fruits of skies that ever smile and lands that ever bloom, ignorance and indolence and pauperism, yet reared their heads amidst all the long two centuries of your tillage. Your sons have left your firesides to seek the broader and easier culture of the West; thither, as old England has sent her better breeds of cattle, so New England has sent her better breed of men: it remains to be proven whether in their new abode the latter, like the former, will improve upon the original type.

If, then, the chief end of New England farming had been to deal with men, mentally, something as Bakewell did with cattle and sheep, physically, beginning from so excellent a starting point, and furnishing for the free expansion of every native energy, influences so bracing and self-sustaining, while we might accord to such an agriculture, a rank still more exalted than to that of the famous English breeder,—still, as our race, unlike those in Bakewell's hands, is said to be perfected only through much tribulation, we might not end by placing the actual attractions of New England farming, for more selfish purposes, in a very winning light. And it is with the other and more immediate objects of the farm that we are to deal—as the scene of toil, indeed, but as affording opportunities, which we believe to be worthy of closer study and more zealous exertion, of securing a fair reward for that toil—opportunities moreover, which it is the design of a society like this to bring to yet fuller development, and to place still more readily within the comprehension and attainment of its members.

It is the result of increasing experience in the capabilities of a country, as it grows older, and the great principle of "division of labor" becomes more generally recognized amidst a denser population, to resolve the problem of the comparative purposes to which the different parts are best adapted. Water does not more surely tend to its own level, than do the various branches of agriculture seek an equilibrium, provided there are cheap and untrammelled channels of intercommunication and transport, as there are among us. In this point of view, the history of the farming of any one district or of the country as a whole, might be rendered most instructive, if so written that we could trace in it the various steps by which the present equipoise, so to speak, has been arrived at, and ascertain more clearly what are the essential, and what are merely incidental, conditions of that equipoise, where we are to draw the line between a well advised adherence to established systems, as being the offspring of long practice founded upon immutable laws, on the one hand, and a senseless clinging to the past on the other, simply because it is the past. At the present time wheat is brought from the Valley of the Mississippi to feed the farmers of Massachusetts, and hams from Cincinnati to supply the breakfast tables of Boston and Worcester. Under the competition of our great western country, with its exuberant and almost costless production, English farmers, too, are discussing the propriety of reducing their extent of grain land, modifying their system of cultivation, and grazing still larger quantities of stock, since we have not yet discovered any way of sending them beeves and wethers fattened for the butcher. Great Britain also furnished a striking example within her own limits of the appropriation of the land throughout whole counties mainly to some leading branch of agriculture. Norfolk and the Lothians are thus wholly devoted to tillage; Cheshire and Ayrshire are chiefly dairy counties; Northumberland and Aberdeenshire excel in grazing and breeding. I have been on farms of hundreds of acres in Norfolk that did not keep a milch cow for the supply of the table, nor raise a calf the season through, so rigidly is a particular combination of grain culture and the feeding of animals for the shambles there carried out. French hens lay the eggs for all England, and many of them are eaten too, with bacon or ham packed in Ohio and Illinois.

Thus it is her natural conformation, as well as the competition of the West, that has turned the general farming of Massachusetts (that in the vicinity of cities, and in some river valleys, being for the moment excluded) mainly in the direction of breeding, grazing and feeding, dairying. In a word, it is grass farming and not grain farming, which constitutes your chief interest.

A careful examination of the Census returns for 1850 and 1860, to which I have devoted some time, together with your State Reports upon the Industry of Massachusetts for 1845 and 1855, seems to show that no very great changes have taken place in your farming during the past ten years,—those which have occurred being mainly of the following kind:

The extent of land rated as "improved" in the State, is reported in 1860 as but one per cent. greater than in 1850, which represents an increase of only about 22,000 acres. But the value of farms shows an advance much larger, (13 per cent.,) proving that farm property is enhancing among you, probably owing to an increased revenue yielded by it, arising partly from larger production and partly from larger prices, at the latter period than at the former. The surface under tillage for the grains (wheat, rye, Indian corn, oats and barley) was somewhat smaller even, in 1860 than in 1850—a decrease, in the aggregate, of about three per cent. It is presumable that this slight diminution is due to the occupation of lands formerly in grain, for the growth of the garden and orchard products demanded by your cities, and of such other crops as tobacco, which has grown to its present importance in your State, almost entirely within ten, if not within five or six years past. An increase in the hay crop, shows that the surface mown has also been extended; more hay is probably sold in the cities now than ten years ago, and the improvements of modern machinery —the best mowers, and hay spreaders and hay rakes of the present day, render this sometimes one of the least costly and most profitable crops that can be grown on a large scale, in the neighborhood of good markets.

Nor can we proceed without remarking that to the inventors and manufacturers of improved farm implements and machinery, as well as to the agricultural periodicals and exhibitions by which they have been made known to the public, is to be ascribed much of the progress our agriculture is making from year to year, and no small share of the ability we have shown to carry on a war and at the same time produce crops, that are both of almost unprecedented magnitude. The value of the implements and machinery employed upon the farms of this State, is reported as twenty per cent. greater in 1860, than in 1850, for each acre of "improved land"—an increase which is likely to be below, rather than above the truth, and which has certainly gone on since 1860 in a rapidly enlarging ratio.

Coming now to the live stock, we have to note a considerable increase in milch cows, while a slight increase in butter and a falling off in cheese, show that a smaller amount of milk produced was manufactured in these two items, leaving something more than the actual increase in milch cows to supply the greater demand for milk by your growing city and village population. Working oxen appear to be decreasing in numbers, and farm horses to be increasing. Other cattle show a considerable increase, proving that more is done in feeding and grazing than heretofore. Sheep, which had already shown a great decrease in 1850 upon 1840, took another tumble during the ten years previous to 1860, decreasing one-third, and swine were also somewhat reduced in numbers. But, taking the aggregate of the farm stock kept, so nearly as we can set off the increase in some kinds against the decrease in others, I think it safe to affirm that the farms of the State are now carrying a *somewhat* larger burden than they did in 1850—perhaps, in general terms, equivalent to the keeping of from a hundred and three to a hundred and five head of cattle on land which then supported a hundred.

And in the character of the stock kept, there has been a marked improvement. The valuation aggregates thirty-two per cent. more in 1860 than in 1850, and if we allow for an increase of five per cent. in the total number of animals, we shall still have about twenty-five per cent. for the increased valuation per capita on the whole. I cannot find any data to show that the markets for animal products have advanced sufficiently during the ten years to account alone for this increase; and while the change in the character of her live stock has not been so great in Massachusetts, during the period referred to, as in New York and throughout the West, owing to the fact that the general character of New England cattle was superior to that of the so-called "natives" in other States, and there was thus less room for improvement,—I think you will agree with me that this improvement *is* perceptibly going forward; that a more precocious maturity and greater size for the shambles are now attained, taking the average of all the New England stock that goes to market, while I know that in no State does the demand for improved animals evince a more healthy activity than here in Massachusetts, during the present year.

If, then, the chief end of your farming is comprised, as we have stated, in the three directions of breeding, grazing and feeding, dairying, we may perhaps linger profitably for a few moments over these subjects, taking them up in the order named:

I. Breeding.—I presume that to the more northerly and less densely populated States of Maine, New Hampshire and Vermont, may be advantageously left the breeding of much of the stock that comes down into Massachusetts pastures and stalls to be grazed and fattened, or into Massachusetts dairies to be milked. Hence much of your stock must be taken as it comes; but there is not the less some opportunity for improvement here by the gradual introduction of breeds which shall turn the feed they receive to better account if possible, either for meat or milk, as may be preferred. Let us glance, very briefly, at the various breeds which now present their claims upon your regard, and, in doing so, I should say that I am not conscious of any prejudice, as I certainly have no interest, in favor of one breed rather than another, except in so far as observation among practical men here and abroad, has made me in some degree acquainted with the results and tendencies of their experience.

1. Among *Cattle*, you will not be surprised I am sure, that the result of that observation has been to rank the Short Horn decidedly at the head of all other breeds for crossing upon common stock — its grades proving themselves uniformly heavier, more symmetrical and more precocious as feeders, and, as regards the milk pail, occupying at least a medium position. The main exception, if any exist, to the adoption of a Short Horn cross upon your stock—which, by the way, I believe to be admirably adapted for such a cross and likely to produce from it animals excellently fitted to meet your general wants—must be either in the case of farms peculiarly exposed and poor in herbage, or perhaps in those upon which the production of milk for sale is the chief object. In the former case the Devon, smaller in size and more capable of resisting cold and hunger, will occur to you; and, in the latter, the Ayrshire may be preferable, uniting as it does a larger flow of milk, with a frame on which, at the last, considerable flesh of very good quality may be attained for slaughter. The Ayrshire has succeeded well, moreover, on farms where butter and cheese are staples, although, as such farms should ordinarily pay greater attention to fitting beef for the butcher and are more

likely to raise their calves, many would be inclined to a Short Horn cross on these, provided due advantage is taken in keeping the cows in good enough order to pay for themselves as beef after they have brought in the revenue of the churn and the cheese press. The Alderney affords an excellent strain for small butter dairies where the butter is really first class, and can readily be sold at first hand to those who appreciate its excellence and are willing to pay a larger price accordingly; but this breed is scarcely to be recommended for general dairy purposes, since it cannot be forgotten that the ultimate destination of all horned cattle is for the table, and the Alderney leaves little more than a skeleton after the milk pail is filled.

2. As regards *Sheep*, I cannot omit to urge upon your attention the earnest conviction I feel, that they do not receive among you the attention to which they are entitled. What is the reason of this neglect? It cannot be that there is any thing in your climate which should confine you exclusively to dairying, or any thing in your grasses which makes better beef than they would mutton! You know of the county of Ayr, from which the Ayrshire cattle come, mainly I presume from its fame as a dairy county, but how is it with sheep there?

I will not weary you with all the details of the statistical comparison I have drawn up between your own county of Worcester and that of Ayr, but let me state that with an actual area 40,000 acres smaller than that of Worcester, Ayr has a larger surface on which a tillage rotation is carried out, so that she produces about four times as much grain as is grown in Worcester County, mainly oats and wheat. Now the total number of milch cows in Worcester County, in round numbers, is 34,000 against 40,000 in Ayrshire, and of other cattle, old and young, 28,000 here against 45,000 there, which, making a total of 62,000 against 84,000, in view of whatever difference there may be in natural capacity, we may suppose to compare perhaps as favorably as we could expect. But now take the sheep,—and Worcester County, with all its admirable grazing lands, with all its productive power for hay and Indian corn and roots, with all its facilities for the purchase for feeding of the sheep brought down from the North and West by railroad to your very doors—with its 700,000 acres of land almost immediately adjacent to one of the largest cities in

America, and with a constantly growing manufacturing population of its own, can only muster about 6,000 sheep—less than there are on some single estates in Great Britain, against almost *a quarter of a million*—forty times as many, in the county of Ayr.*

Now, gentlemen, I have already adverted to the fact that experience in any particular region, ends by settling down more or less definitively upon some particular branch of farming; and so much weight, I am willing to admit, should be given to practical conclusions thus arrived at, as to render it somewhat hazardous to advocate the adoption of fundamental changes except for the strongest and clearest reasons. And what I would suggest here, is rather an effort to augment the stock of the farm, to reach, a little more nearly the standard in

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* *Agricultural Statistics of the Counties of Worcester in Massachusetts, and Ayr in Scotland, for the year* 1855, *unless otherwise specified.*

| | Worcester County. | Ayrshire. |
|---|---|---|
| Total area in acres, | 706,000 | 665,000 |
| Population, (Worcester County, 1860, Ayrshire, 1851,) | 159,659 | 189,858 |
| Number of Farms, | 7,002 | 3,329 |
| Area "Improved Land," acres, | 483,472 | – |
| Area "Under Rotation of Crops," acres, | – | 258,154 |
| Crops produced—Wheat, bushels, | 46,101 | 430,421 |
| " acres, | 650 | 12,847 |
| Rye, bushels, | 51,571 | 12,127 |
| " acres, | 3,967 | 362 |
| Barley, bushels, | 41,137 | 33,221 |
| " acres, | 1,890 | 971 |
| Oats, bushels, | 283,556 | 2,475,186 |
| " acres, | 9,930 | 61,648 |
| Indian Corn, bushels, | 418,918 | – |
| " " acres, | 16,185 | – |
| Total grain, bushels, | 841,283 | 2,950,955 |
| Total area Grain crops, acres, | 32,622 | 75,828 |
| Other Tillage crops, Potatoes, | 9,439 | 8,167 |
| Turnips, | 172 | 16,480 |
| Other Roots, | 658 | 1,136 |
| Beans, | – | 3,485 |
| Other crops, | 1,481 | 898 |
| Total area Roots &c., acres, | 11,750 | 30,166 |
| Area in Hay, | 117,117 | 151,216 |
| Fallow, | – | 944 |
| Area under Rotation, Ayrshire and corresponding area in Worcester County, | 161,489 | 258,154 |
| Live Stock—Horses, | 13,484 | 9,702 |
| Milch Cows, | 33,917 | 39,286 |
| Other Cattle, | 18,561 | 28,809 |
| Calves, | 9,443 | 15,913 |
| Total Cattle, | 61,921 | 84,008 |
| Sheep and Lambs, | 6,212 | 245,373 |
| Swine, | 11,023 | 12,483 |

Ayrshire, for example, and to render the land more productive of food to keep that stock, and thus more productive of manures to add in turn to its own fertility—than that any of the stock you are now keeping should be discarded to make way for sheep. The truth is that good farming tends so explicitly and so universally to increased favor for mutton growing, that I cannot but think it is that direction which the improvement of our agriculture at the East *must take* before our farmers can hope to accomplish much more than they are already doing.

For you will please note that it is not with the most remote reference to the present high prices of wool, that I speak. The cheaper lands of Michigan and Wisconsin, and when the Union is re-united, of Texas also, can grow wool as fine as we can grow it here, and send it to market with as little, or still less, loss from the cost of transportation, as any other product they can raise. It is the breeding of *mutton sheep* that is suffering most from neglect, yielding an income every year, involving some profit, from the fleece, which cannot be had from cattle, and selling at last to the butcher at a rate that shall return at least as good results upon the food and labor they have cost, as can be yielded in fattening beef.

Now among the breeds suggesting themselves for the purpose, there is considerable range for selection. The South Down has the advantage that its name goes far in commanding a price, like that of Alderney butter, with those who can appreciate and are disposed to pay for it. But the Oxford Downs which have been introduced into the neighboring county of Essex by my friend, Mr. Fay, are a somewhat larger sheep, which, with their other merits, is constantly gaining them increased favor in Great Britain. The Cotswolds give perhaps still greater size, and on good pasturage yield a good account for all they consume, while, moreover, you have flocks of them in your own vicinity worthy of encouragement. The "Leicester" sheep bred in this country have mostly a touch of Lincoln or Cotswold blood to increase their weight, and are preferred by some to the pure Cotswold.

In breeding both sheep and cattle, then, let me insist once more upon the importance of crossing constantly with some of the improved breeds that have been named. There must be herds and flocks purely bred to sustain the supply of blood for crossing; but the practical farmer will find, here as in Great Britain, that the crosses are the best tools he can work with in carrying on his farm, and making the cash account come out right at the end of the year. With sheep, the ewes required should be good mothers as a first requisite, and then, whatever their size or breed, lambs sired by South Down or Oxford Down or Cotswold or Leicester blood, will be pretty sure to pay their way.

II. Grazing and Feeding.—In what has been said under the head of Breeding, it has been taken for granted that the stock bred were to be fitted for slaughter or retained for use, not necessarily in the hands of the breeder, but at least within the limits of your own State. Time will oblige me to restrict myself only to remarks of the most general kind, both under this head and under that of Dairying, keeping in view *the broad results we desire to attain*, rather than the details by which they are to be accomplished.

Breeding, and grazing or feeding, naturally divide themselves in some degree, into separate pursuits; and stock commonly passes into second hands for the latter purpose before going to market. At the same time, the farmer who raises young stock naturally has more or less concern with fitting it for the shambles. Aside from the fact that working oxen are largely employed here, in the labors of the farm, most of which are probably reared and trained at home, and after their term of service is over, may well be put up to fatten; your ready markets afford good inducements for the breeding of calves and lambs, expressly to be fattened by the farmer raising them. Secondly, the opportunity of purchasing cattle and sheep coming into Brighton and Cambridge, when markets are low, and those not already in prime order can be bought to advantage, and of then keeping them in pasture or stall until a good market gives the means of selling at a fair return, is one of which there are doubtless many among you who frequently avail themselves. And, in the third place, there is the surplus of the young stock bred in a higher latitude, which naturally comes here to be "finished off," if not to acquire the bulk of the flesh it must attain for slaughter.

Now, where the sources of supply of stock for grazing and feeding, are so good as they must be here, the farmer possesses perhaps the most advantageous of all positions for bringing his farm into a fertile and remunerative condition. Those of you whose experience is of the longest standing will not have to be reminded that the great need of the agriculture of our older States at the present time, is a more abundant supply of fertilizing material. Manufacturers of artificial manures are driving a better trade in New England, probably, than in any other part of the country, now that the impoverished lands of the South are mostly cut off from their reach. Those of you who are familiar with the printed treatises on agriculture, from the earliest of the ancient writers down to this most prolific century of books and papers and addresses, will not have to be reminded that the great burden of their whole song is Manure! *Manure!!* MANURE!!! And as I run over the journeyings of a summer spent among the best farmers of the United Kingdom; as I note the successes of the shrewdest and most thorough of the cultivators of our own soils; as I trace back the files of the old "Genesee Farmer," the "Cultivator" and the "Country Gentleman," in which I have an interest, personal or hereditary, extending back for more than thirty years, I find that what observation in England and Scotland teaches us abroad is equally true on this side the Atlantic—that the care and quantity of manure made may fairly be taken as a measure of the profits obtained,—that with this as the first object sought all other objects are in turn accomplished,—in a word, that the farmer's first and most important crop is that which comes out of his barnyard!

And beyond this, my friends, it is the fundamental verity and weight of this great fact, which first led the English breeder to those improvements in cattle and sheep which we have just been discussing, and of which you have had examples on your show grounds to-day, in the several breeds there exhibited, more than three thousand miles from the place of their origin. To raise crops for the food of man, stock must be fed and crops for their especial consumption produced; and the problem of securing that stock which might be fed to the greatest profit, reaching its importance out of the primal necessity experienced by the English farmer *for more manure!*

provoked those efforts on the part of Bakewell and the Collings, and Elman and Webb, and their compeers, which render the names of these leading breeders as familiar to-day on the banks of the Danube and the Loire, in Australia and New Zealand and California, as they are here in Massachusetts, on the blue grass pastures of Kentucky, or the prairies of Ohio and Illinois. Your accomplished and practical Secretary, Mr. Wyman, expressed the truth which you must often have realized in your own labors on the farm, when he wrote to the "Country Gentleman," six years ago, that the foundation of all successful culture lies in the preparation and application of an ample supply of manurial material, and that every sort of article which can be made to contribute toward this end, should be saved "as carefully as if they were grains of gold."

The course of English farming, not less than various experiments conducted there and here, shows that in nothing else do we get a more effective combination, or one more universally applicable, than in all the well managed manures of the farm-yard. And the point to which I wish to ask your especial attention is whether you cannot more economically purchase such feeding material for the stock you intend to fatten, as is most readily attainable, and take more pains to produce crops for them—such for example, as fodder corn, the legumes and the roots, than you can to expend your money on the fraternity of super-phosphates, poudrettes and the like? These will doubtless give the farmer *a start* in securing a position at which he can eventually furnish fertilizing material to supply his own wants; there are crops, such as roots, and some partially exhausted pastures, on which preparations of bones may be profitably applied in any case, but the great question is to reach such a system of management by the grazing and feeding of stock, as shall develop the capacity of the land to the utmost, either for that or for any other economical purpose, and then maintain that capacity, by going as little as possible, and not at all, if possible, beyond the home resources of the farm itself.

III. Dairying.—There is no branch of farming in which greater encouragement is at present afforded perhaps, than in the making of butter and cheese—unless for those so situated as to be able to dispose of the milk itself. We have learned to make both of sufficiently good quality to command buyers abroad; in no country is the consumption, of butter at least, so great in proportion to population as among ourselves, so that, between the home and foreign market, there seems no reason to fear that a strictly first class article of either should ever fail to bring a remunerative price.

With this consideration before us, there is one suggestion which may be perhaps most forcibly brought to the notice of dairy farmers, although you will at once recognize its applicability I trust, to farming of every other kind, and that is, that *the better the product—the more perfect the process of its production—the better the profit it yields.* Within the scope of this suggestion, is the more careful selection of the cows that constitute the dairy, in order to raise the average yield of butter or cheese for each cow kept, to as high an amount as possible, but upon that point we have partially touched under the head of Breeding. Within it, too, is the idea of higher keeping, so that the cow when done with for the dairy may sell well to the butcher—but to this we have also referred, in the last division of our subject. Within it, are embraced moreover, all the details of the dairy, the neatness and the skill required, and the numerous conditions by which the greatest excellence and largest product of butter or cheese may be made to go hand-in-hand; but, in an address like this, such details can hardly find a place.

You will then pardon me, if, passing outside of these minor but still most essential particulars, I give to this suggestion the broader ground on which it may not only include *them* all, but go beyond the limits of the dairy, and also reach, in these, our closing paragraphs, the interests of the breeder and the feeder, indeed of all who are engaged in farming throughout the Eastern States. Could we not accomplish more satisfactory results, at less cost and hazard, if we had greater faith in our pursuit, and were willing to invest more of our capital in carrying it on?

There are those, of course, who lack the means of more liberal expenditure on their farms,—who are compelled to economize, even when expenditures could be well repaid, because there are payments of interest or principal on their title deeds which must be met—but there are now also many others, who are constantly on the alert for investments, away from the farm, of the money it has placed in their hands. If instead of taking, dollar by dollar, all that can be scraped together to buy stocks or mortgages, or venture into still more speculative undertakings, such farmers would only calculate the rate of interest they might obtain from a sufficient outlay to bring some part of the farm every year into the highest condition of productiveness of which it could be rendered capable, until by degrees its whole surface and that of the township in which it lies, should be thus gone over, the startling disparities that now exist between the productiveness of your county of Worcester and that of Ayr, would by degrees be vastly reduced, and, unless I am much mistaken, your farmers here would in the end discover that their investments were safer, their interest larger, their farms still more rapidly appreciating in value, and their eventual means of making outside investments greater than at present. How many fields there are, now grown up with coarse herbage and affording only a short and poor pasturage, insufficient, very likely, to meet the actual taxes assessed upon them, which a hundred or two dollars in drainage, for example, might render the most productive part of the farm, returning, thereafter, taxes, cost of labor, interest on value and expenditures, and something beyond. How far short is a large part, not of this county alone, but of the whole State and country, of being in that condition which any practical farmer will recognize as the best, either for permanent grass or for a rotation of tillage crops—but which, how many farmers who know well enough by what means that condition is to be attained—whom I would not for a moment think of attempting to instruct in any of the secrets of their business—are contented not to reach, dreading the outlay required, because the returns seem distant,—preferring to send their money, very possibly, "out West" at one or two per cent. a month, and pinch the farm forever tighter and tighter because that money don't get back from its Western tour at all. Such, gentlemen, is the fact, alas! of multitudes of investments outside the farm; if the farmer understands his business, should not his endeavor be, like that of the merchant or the manufacturer, to go on investing capital in it, until its machinery everywhere runs as smoothly, and its working powers are as greatly perfected, as capital can make them? The larger the scale also upon which any business, farming included, can be conducted, the better; provided only the capital is in proportion to the business done; and when we say that nine-tenths of our farmers are farming *too large a surface*, we only mean that they are attempting more than they have, *or will use*, the capital to do thoroughly and well.

Farmers of Massachusetts! I ask you to bear in mind that it is not your only end in life, still speaking agriculturally, to secure a comfortable and honored livelihood from one year's end to another, as the seasons gather themselves in succession to the mighty harvest of the past, as the little faces around your firesides are putting on the soberer guise of more thoughtful years, as the frosts of an autumn to which there is no springtime of renewing verdure, begin to whiten upon *your* temples. I ask you that it should be your aim to secure that livelihood in such a way as shall add to the dignity and solid attractiveness of your pursuit for those who are just coming on to the stage, and whose selection of the parts to which their lives shall be devoted, will be so greatly influenced by the results of *your* lives and the teachings of your example. I ask you to take your part in the farther improvement of the farming of the State, not alone in your own interest and in that of the community in which you live, but for the sake of the generation which is to follow in your footsteps. It is not that I would urge you to any mingling of high-sounding words or theories, but yet imperfectly understood, in the round of your daily labors. It is not that I would present the picture that might be drawn, of a wooing and gentle and loving Nature, to none so dear, by none so freely and proudly enjoyed, as by him who sits amidst his own well won acres, under the roof that sheltered his fathers. It is not that I would remind you of the close alliance between your occupation, with its many requisites, and a thorough study of all those physical sciences which link themselves so closely with the culture of the soil, nor of the fact, that the higher the culture of the mind, the greater may be the pleasure derived from investigating the problems and winning the victories of the farm. But I would meet you among the implements, the animals, the fruits, the household articles, that are assembled on such an occasion as this, directly from your homes and fields, on the practical ground of farming, not as some are fond of styling it, as a *profession*, but as a BUSINESS. And I would suggest to you, that it is still more *as a business* that it should be conducted, in order to satisfy in it the longings of your sons, possessed as they probably are, of that inborn energy, that Yankee go-a-head-ativeness, which delights in overcoming obstacles when the mind is once awakened, and fair scope for its exercise is offered. Train them in the keeping of your accounts; and let each year's figures enter more fully into detail, until there is no question that can come up, to which the answer in black and white may not be found on record. As you shall invest more capital in bringing up your land and carrying out improvements, let them see the object in view; let them share with you the pleasure of working out a successful result. A practical familiarity with the labors of the field they must doubtless acquire, in order to be farmers; such an education as lies within your means, every American father, thank God, gladly gives his sons: but, if you would have them farmers worthy of the name, remember that there is much beyond holding the plough or studying in the school-room, that tends to mould the tastes of childhood, to direct its thoughts, to arouse its spirit. You can not only show that you are managing your business with the same precision and as great mental energy and foresight as the merchant, but, more than this, in every plot from the garden you give to childish hands to till, you can encourage the effort to make the most and best of what it yields; in every pet from the poultry-yard, or in the barn or field, you grant them for their own, you can take care that it shall be a good specimen of its kind, of which the youthful owner may be justly proud—in fine, you can interest the child in *reading about* the land he cultivates or the animal he cares for, you can induce him to *think*, you can implant in his mind the ambition to *excel*. In these three directions, moreover, lie the great deficiencies of our grown-up farmers.

Farmers of Massachusetts! Grand as is the task of agriculture in feeding mankind, and vast as are the interests of which it holds the key, there is a level higher than that of our material wants—beyond and above the sphere of bounteous harvests and busy ships and peaceful homes,—of all that is transient and perishable,—a level at which the dignity of your own and every other pursuit of gain or pleasure, is merged in the nobler and more enduring dignity of the manhood that is the birthright of the soul. Such, and so far above the platform of our daily struggles, is the great battle-ground of Freedom and Truth on which our country is now contending. For the Independence earned by our fathers' hardships; for the Constitution they bequeathed us, hallowed by the blood it cost, glorious in the light of the triumphs it has won; for territory inviolate, for sovereignty unimpaired, for Union inseparable,—for these, and nothing else and nothing less,—let the country strive as one man, with all the strength and faith and stubbornness that arise from consciousness of duty and Divine approval,—and no corruption of cities, no miserable clangor of party discord, no vile hopes of profit or promotion in the disgrace of that grand old Flag, shall avail to drag its stars and stripes in the dust, or blot out the ensign of the Republic from the heraldry of Nations!

# THE FARMER'S LIFE.

From an Address before the Hampden East Society.

### BY JOSEPH VAILL.

The foundation of all secular pursuits,—the moving spring of all worldly enterprise is found in the cultivation of the earth. Husbandry, and especially that department of it which we denominate agriculture, is the great central wheel in the mighty machinery of business, which sets all the other wheels in motion. But for this, the ocean would never be whitened with canvas, and the timber now converted into mighty ships, would remain unmolested in its native forests. But for this, not a spindle would have been set in motion, nor the walls of a manufactory ever have been reared.

But for this, no banking-houses would exist, and no investments of great moneyed capital have been made to carry forward useful arts. The cultivation of mother earth forms the basis of all secular business. From this source is to be derived, as long as the world stands, every thing that goes to enrich its inhabitants. It is the great central sun around which all business pursuits revolve, as so many satellites, borrowing all their light and heat from this one fountain.

It needs no argument to prove this. It requires but a moment's reflection to see that if agriculture and its legitimate fruits should cease, the wheels of business in every department would come to a stand-still.

But not to pursue this course of remark, let us look for a moment at agriculture in itself, and see whether we have not, for other reasons, occasion to thank our Maker for it. And in the first place, let us look at the honorable nature of this employment. It is honorable because God has ordained it, and to engage in it is to carry out that Divine plan which He formed for man, even in a state of innocence. Our first progenitor had not fallen when God put him into the garden to "dress it and to keep it," and of course He was not inflicting upon him a degrading service, but simply prescribing a course of life which would be in good keeping with his exalted and holy nature. Now, the simple fact that our Maker ordained agriculture to be the employment of a perfectly virtuous man, shows most conclusively its honorable nature.

Another consideration that goes to show the same fact, is, that agriculture is labor bestowed on what God has furnished to man ; I mean, on that earth which came immediately from his own creating hands. He who devotes himself to the cultivation of the earth is laboring pre-eminently on God's premises. He is doing, as His tenant, just what he would have him do. He is working for his heavenly proprietor, and with materials that have been prepared to his hands by Him who was able to furnish the best, and who has promised to give success in using them for the purpose for which He made them.

The agriculturist is working in the immediate employment of his Maker, who created the earth expressly for man to cultivate, and who put it in a condition that he might do it to the best advantage. And is not this an honorable employment ? Who need feel himself degraded in pursuing God's plan in getting a living ? And then again, it is honorable to engage in cultivating the earth, because no one can do it successfully without unceasing toil. I speak especially with reference to the rocky coasts and rugged hills of such a country as our own New England. This fact, considered in connection with the absolute necessity of this branch of business, must invest with honor those who are willing to engage in so laborious an occupation. They dig in the earth that others may figure in the counting-room, or at the bar, or in the halls of legislation, or launch out in commercial or manufacturing pursuits ; and that every other branch of useful and lucrative business may be carried forward for the good of the country.

Narrow-minded as the man devoted to the cultivation of the earth may be, there is a sense in which he does not live to himself, and this, considering the unremitted toil to which he must be subjected, would he make his employment successful, invests it with honor. Moreover, it is honorable because an honest employment. Not that the agriculturist may not be a knave and a cheat, yet I believe it must be acknowledged that he has less opportunity to indulge in dishonest dealing and play the rogue than almost any other class of men. Besides, this employment is rendered honorable from the fact that great and good men in every age, from the days of the holy patriarchs down to the present period, have chosen it for themselves. The pursuit of agriculture stands associated with some of the noblest names that ever graced the world. To mention that of the immortal Washington is enough. It is eminently the employment to which those who retire from the most elevated stations of professional life, have resorted to render quiet and serene the evening of their days. Men who have commanded armies, or who have occupied the bench of the highest court of the nation, or have shone as brilliant lights in the senate chamber, or who have even filled the presidential chair, have not felt themselves as suffering any diminution of honor in resorting to the cultivation of mother earth, no, not even if they had soiled their hands or darkened their brow by going forth themselves to hold the plough or drive the team. The Father of his country had no less honor attached to him when cultivating his beautiful plantation at Mount Vernon, than when he stood at the head of the American army, or when presiding in the first American Congress.

I have presented these views from the fact that many, and especially among the young men of this proud and vaunting age, affect to look down upon farming as a degrading employment, as beneath the notice of a high-minded man. They look with scorn on the idea of digging in the earth for a living. This is quite foreign to their notions of a gentleman, and hence they must needs abandon the plough, the spade and the axe, and put on their broadcloth, and steam up for a dandy, and then fly away to the city, where they may find employment in some inferior clerkship, or in superintending an oyster saloon, or in serving the drunkard in some miserable dram-shop. Ah, this is honorable indeed ! and especially when compared with the vulgar business of driving the plough and tilling the ground. Such drudgery is quite too intolerable for them.

Along with the honorable nature of this employment, let us look at some of its *advantages*. I might speak of the advantages of labor in general. Work is man's appointed task. It lies at the foundation of all progress, of all hope, of all good, both here and hereafter. From first to last, life is a school to teach activity, effort and labor. Not only every sense, but every muscle of the body must be trained. Every intellectual and moral power within us must be brought out and cultivated. Nature is a vigorous old school dame, and her morning greetings and her evening charge to her pupils, are just what the voice of God is, and that is, that "he who will not work shall not eat." Let us thank our Maker that it is so, — yes, let us thank Him for labor. It is the only way of happiness and self-respect. A lazy man is a defaulter under God's government. Nature has no respect for him. She uses him very roughly, and were it not for his few friends, he would be starved and put out of the way. "If you ask the stars, or the ever-swelling sea, or the untiring forces of earth or air, they will tell you he only is living like a man and worthy of the honor of manhood, who goes about his appointed duty manfully." All others are intruders, drones, or something worse.

To *agricultural* labor, above all other, are we to look for the greatest advantages. These may be arranged under three departments—physical, mental and moral. And what are its physical advantages? Who does not know that there is no other labor like this, to promote bodily vigor? What is it, but exercise, other things being equal, that gives solidity to the muscular system, and strength to the nerves? And where should this exercise be taken? In the open air under the pure breath of heaven—in nature's own laboratory. It is God's atmosphere that is best adapted to health. To breathe this freely, with appropriate exercise, is the grand secret of a vigorous constitution. These, the agriculturist above all others, enjoys, and it is a matter of fact, that of all men, the industrious, working husbandman is the most healthy and vigorous.

Moreover, the morning is the best of the day, and the sooner after its dawn, we begin to breathe it freely, instead of the stifled atmosphere of our bed-chambers, the better for preserving physical strength; of all men the industrious, provident farmer is the last to hug his pillow in the morning. And then, again, active exercise not only imparts an agreeable relish for food, but contributes to promote its healthy digestion, and by the same means, sleep is rendered sweet and refreshing, and our very dreams are made pleasant.

Look at the sturdy farmers of New England, if you wish to find the bone and muscle of the country. They are quite another set of beings from those walking ghosts, who are brought up on sweetmeats and spend most of their days in dwellings heated up to seventy-five or eighty of Fahrenheit, through the agency of modern salamanders.

A prudent and systematic farmer, finds his medicine in his field, instead of on the apothecary's shelf, and his physician in a kind Providence, whose services are freely and gratuitously rendered. No doctor's bill to pay here. Show me a temperate and industrious farmer, and I will show you, physically, one of nature's noblemen. You will, ordinarily, find in him a consolidated frame, and a constitution that is not broken down and upset by every wind that blows. Exceptions there may be; I speak of the pursuit of agriculture, only in a *comparative* view, and in this regard, I venture to say, that it is more favorable to health and longevity than any other employment of man.

In addition to this, look at its intellectual advantages. Our Maker has given us three volumes to study with reference to our intellectual culture; the volumes of Nature, Providence and Scripture. The pursuit of agriculture legitimately leads to the study of all these, but more especially the volume of nature. To the intelligent and reflecting farmer, this volume must become one of deep interest, and what is the tendency of its study but to elevate, expand and improve the intellect of man? In agricultural pursuits, we are led to contemplate God in nature. We go forth into the fields He has made and behold the rocks and hills and vales as they come immediately from His creative hand. We look abroad upon the waving forests, whose tops well-nigh lose themselves in the clouds; we view the extended landscape, and as the eye sweeps over the wide fields of its vision we see what variety and beauty the Great Architect of nature has given to that wonderful planet which He has fitted up for the accommodation of man.

Now these magnificent works of God, are from their very nature, adapted to employ the intellect, and wake up its slumbering energies, incomparably beyond any thing presented in the works of human invention. And then too, the agriculturist dwells so much among the beauties of God's creation, surrounded with blossoms in endless variety of form and hue, whose fragrance he is constantly inhaling; and if not with blossoms, with *fruit*, rich and luxuriant, when bright autumn pours forth her stores; he must be obtuse indeed, if to his intellect is imparted no expansion and vigor.

I do not say that every agriculturist is furnished, by his employment with a cultivated intellect, or that the great body of farmers in New England, have derived from this employment this high advantage. Be this as it may, I speak of its happy tendency, and I fully believe that an advantage might be experienced in this direction, with proper attention to the subject, that would place our agricultural men in the front rank, in point of intelligence, as well as in taste and refinement. I hail the day when this branch of business is to hold a more important place in securing a finished education. Much attention is now being awakened to this subject, but the work has but begun. We greatly need men of intelligence who shall devote, not only their time, but their fortunes for the advancement of agricultural science ; men, who will rely on posterity to appreciate their discoveries and improvements and do honor to their memories. Here the aspirant for fame has a fairer prospect for distinction than he can find in any kindred art or science, and for this most obvious reason, that agriculture lies, as we have seen, at the foundation of every other branch of lucrative or honorable business.

It was my purpose, to have noticed in addition to what I have said, the moral influence of agricultural pursuits, but I most fully see, that I can do no sort of justice to this topic, without trespassing upon your patience, I must therefore pass this over, while I proceed in a word, to express my gratification in meeting to-day such a respectable company of agricultural men, together with their wives and daughters, than whom, no other class in the community share so largely in my respect and confidence.

That minister may consider himself fortunate indeed, who has an intelligent farming population for his parishioners. If he has their confidence, he may be sure, if he has any thing to appreciate, he will be appreciated. And moreover, he may be sure of a good bit now and then, if not of shining metal, of well-fattened New England beef and other things in proportion, and much the same every year, only a little more so.

These agricultural fairs are not to be undervalued. They are a sort of *exchange*, or rather *trade sale*, that give stimulus to generous feeling, and awaken the grateful emotions of our hearts; and moreover, when properly conducted, tend greatly to encourage and advance that noble employment, which our Maker has ordained, not only to sustain our physical frame and invigorate its energies, but elevate and expand the intellect, and improve and adorn the heart. Will you now indulge me for a moment, ere I close, to tell you, very familiarly and somewhat colloquially, what, if I were a farmer I would do; and I shall best come at this, by telling you what I would not do.

Well, then, in the first place, I would not labor too hard, but take it so fair and easy, and especially toward the last of the week, that I could attend church on the Sabbath and keep awake during the services.

Second, I would not fall into a fit of anger at every little ill wind that blows, and scold at my hired men—and swear at my team—whether oxen or horses, nor would I whip them unmercifully when I deserved it more than they do.

Third, I would not have every thing in just the place where I never could find it.

Fourth, I would not have my carts and wagons stand out of doors to take the peltings of winter's storms or the withering power of a summer's sun.

Fifth, I would not cultivate more land than I could cultivate well, and thus, with less labor, I would secure a greater amount of produce. This having a great farm and never properly cultivating any of it, is a sorry business for a farmer.

Sixth, I would not leave my farm in the hands of others, provided I had a decent one, and were able to cultivate it myself, to go forth to trade in horses or mules, or even to peddle in churns and clothes-wringers.

Seventh, I would not have my pig-sty in front of my house, nor anywhere in proximity thereto, and wherever located, I would not have it so filthy that my porker, in the greatness of his self-respect, would scorn to lie in it.

Eighth, I would not make a cow-pen of my front yard; nor would I place my wood-pile where a neighbor, in a decently dark night—unless he understood my latitude and longitude—would be liable to excoriate his limbs in approaching my dwelling.

Ninth, I would not have my barn-yard so situated as to be obliged to go over shoes in filth to reach my barn door; nor would I have every thing around my premises in a slip-shod, helter-skelter condition, a board lying here, and a stick of timber lying there, and a lye-leach and an ash-heap in the same neighborhood, and other things to match.

Tenth, I would not be everlastingly borrowing, but only borrow enough to show that I was willing to lend.

Eleventh, I would not upbraid my wife because she did not understand her business in the kitchen, provided I had been so improvident as to select such an one to take charge of my culinary department. On this topic, will you allow me, fellow-citizens, to say a word. Now, if I were a farmer, I would use all due care to find a wife that understood her p's and her q's. I would not introduce into my family, to be the queen of the churn and the cheese-press, and to be mistress of the kitchen, a young, lily-livered liliputian, who had been nurtured in a lady's flower-pot, and brought up on cakes and sweetmeats; who would be seized with the horrors at the thought of boiling a dish of pork and cabbage, and get most marvellously nervous at the sight of a wash-tub and a few dirty clothes of a farmer's wardrobe. Were I a farmer, I would not go to the city or its suburbs in search of an help-mate. Nor would I seek for one among those frivolous, doll-like exquisites, who, having obtained a little smattering of music, French, et cetera, at some second-rate boarding school, feel quite above the small fry among our farming population. There are more reasons than one, why, as a farmer, I would not seek such a wife. The first is, she would not have me if I did seek her, and the second is, I would not have her, anyhow. As a farmer, I would take special pains at the outset, to get a wife of the right stamp, a *little better*, indeed, than any of my neighbors, blessed with a good share of common sense, enough to know that she is not too good for the kitchen; in whose ability and neatness as a cook I may repose the fullest confidence, and who will do me the pleasure to do the honors of the table, although I may be surrounded with coal-makers or mud-diggers. Having secured such a wife, who, in nine cases out of ten, will best be found in some good old farmer's family, I should expect to be denied the privilege of much loud talk, not to say scolding, because the bread was heavy, the butter rancid, and the meat and vegetables but half-cooked. Give me such a wife, and I should not expect very often to see the roof rise by a tornado. But I cannot enlarge on this fruitful topic, and I hope I shall be pardoned for the few hints I have given. Having spoken of what I would not do, I will just say, in a word, what as a farmer, I would do.

I would, in the first place, be an intelligent farmer ; I would take one or two of the best newspapers within my reach, not depending upon borrowing an old gazette once a month, and if I lived within any decent distance of Palmer depot, I should be sure to go in for Palmer Journal. I would, in the second place, give my children, if I were so fortunate as to have any, as good an education as my means would allow, contributing to the support of a good school, the year in and the year out, instead of adopting the miserable policy of letting them run half of the year without instruction, and thus forget all they had learned the other half.

I would be a sober farmer. I would use no strong drink, nor provide any for those in my employment, and I would take especial care not to introduce into my family any of those *scaly fellows* who would be likely to corrupt my children by their pernicious example.

I would be an honest farmer, and stand aloof from those contemptible shifts and evasions, and prevarications and manœuvrings, to which multitudes resort to increase their ill-gotten gains. Finally, I would be an independent farmer, and instead of being everlastingly harassed with debt, I would owe no man any thing, but love and good will. So mote it be, with all the farmers who now hear me.

# MOST PROFITABLE FARM STOCK.

From an Address before the Housatonic Agricultural Society.

BY SANFORD HOWARD.

It is obvious that the agriculture of every section must be modified by circumstances; as climate, topography, geology, (as connected with the nature of the soil,) geographical position, and the situation relatively to other sections, especially to markets and depots of trade and commerce. Some of these circumstances may be said to be permanent, while others are more or less subject to change. The physical features of a country must always exercise a controlling influence on its productions and the general character of its agriculture. Mountainous and hilly districts are less adapted to tillage or arable husbandry than plains and valleys. On the other hand, trees of various kinds, and grasses of different species, frequently flourish well on somewhat rough, elevated tracts, even where the surface of the earth and the nature of the soil would not admit of cultivation.

I venture to assume that the circumstances which chiefly influence the agriculture of this section, mark it as mainly adapted to the growth of trees and grass. Probably a large proportion of the land must always be kept to wood, so far as it is capable of any vegetable production. Grass can undoubtedly be produced to a great extent, both for pasturage and hay. In former times, when sections of greater fertility were not settled, or when they had not ready access to our principal markets, the growing of wheat may have been profitable here; but with the present facilities for transportation from the great West, it is doubtful whether grain crops, except Indian corn in favorable localities, can be extensively cultivated here with advantage. Hence it appears to me that the leading interest of the district must be *grazing*.

This being settled, it becomes a question, What kind of stock will be most profitable? Doubtless different answers may be given to this question with reference to particular farms, some being specially adapted to one kind of stock and some to another; but on the higher and rougher lands, where the herbage is comparatively thin and short, there can be no question that sheep will do better than cattle or horses. Besides sheep being better adapted to such situations on account of the superior ease with which they can support themselves, they better maintain the growth of grasses. In some parts of Britain, particularly in Wales and Scotland, land has been constantly grazed by sheep for more than a thousand years, with no diminution of fertility or production, as is known from the number of sheep kept from year to year. Of course, the newness of our country does not admit of its furnishing any such example as this; but we have lands on which sheep have been pastured ever since the forest was cut off, embracing in some instances a period of nearly two hundred years. It is alleged, I am aware, that sheep, in some instances, *run out* pastures, and I do not deny the allegation; but if a result so different from that just alluded to does sometimes occur, it is proper to ascertain the particular facts which bear on the case. What these facts are it is impossible to tell without ocular examination. Different species of grasses differ in regard to their permanency on the same soil; soils also differ in regard to their support of grasses, and the duration of grasses is also greatly influenced by climate and by the characteristics of seasons. Moist soils, climates and seasons are more favorable to the life of grasses than dry ones. The mode of feeding also has an influence. Tolerably close feeding is probably favorable to the permanence of the herbage as well as to its quality; but under the extreme droughts which sometimes occur in our climate, sheep may feed pastures so closely as to injure the grass. Much depends on the kinds of grasses as to their durability; and on this point, and in reference to the adaptation of the species to particular soils, too little attention is generally bestowed in this country. It is frequently the case that the same species which are relied on for hay, are sown for permanent pasture. Timothy, or Herds-grass, *Phleum pratense;* and red-top, *Agrostis vulgaris,*—of two or three varieties, are the kinds commonly sown in New England. The former is comparatively short-lived under any circumstances, and the latter is much less enduring than several other species which afford better feed, as the Kentucky blue-grass, *Poa pratensis*—(one of the species to which the term "June-grass" is applied in New England); orchard grass or cocksfoot, *Dactylis glomerata;* meadow fescue, *Festuca pratensis*, &c. But in the choice of grasses, either for hay or pasturage, close observation in regard to the habits of species is required. It will not do to adopt lists or tables of species recommended in English treatises, or copied from them. Some species which are prized most highly in Britain, as perennial grasses, would not here survive the heat and drought of one summer and the cold of one winter.

Having decided that sheep are the stock for this section, or for a portion of it, the next important point to be decided is, What breed or breeds will succeed best? The answer to this question may be varied by certain contingencies. The different breeds of sheep as well as cattle, differ widely in their characteristics, and in their adaptation to particular localities and purposes. What may be seen in older countries, particularly in Britain, illustrates this. On that island, embracing a territory not much greater than one of our larger States, several distinct breeds of cattle and sheep are kept, and it has been to some extent demonstrated that in the districts which they respectively occupy, they cannot be advantageously displaced. The breeds which are most profitable in the mild climate of the plains and larger valleys, with an abundance of nutritious food, cannot sustain themselves under the cold winds and storms and less nutritious food of the mountain regions. Hence there is a wide contrast in the animals which occupy the different situations. In the lower and more fertile country we find the massive, fat-forming, sluggish, Short-horn ox, and the Leicester, or Cotswold, or Lincolnshire sheep; in the higher, colder, or less fertile regions, we find the active hardy Highland cattle and Black-faced sheep, thriving, and apparently enjoying themselves under a climate which the lowland stock could not endure, even for a season.

But besides the difference in the hardiness of different breeds of sheep, they have other peculiar properties which greatly affect their relative profits in certain cases. Their wool varies widely as to its properties, and its adaptation to different purposes—that which is best fitted for one description of goods being entirely unsuited to another. The prices of the different kinds of wool also vary in different countries or localities, according to the kinds of goods there manufactured. Some breeds of sheep seem to convert a larger proportion of their food into wool and less into meat than others. The leading characteristic of the Merino breed, (including its sub-varieties,) for instance, is the production of wool, the staple being at the same time finer than that of any other breed. Several of the English breeds, on the other hand, are characterized by a tendency to fatten at an early age and to a great extent in proportion to the bone and offal. But the large English breeds, require, to afford a satisfactory profit, a regular supply of good food. The Merino will be less injured by pinching; or if the weight of the carcass is lessened by a scanty supply of food, it is regarded as of comparatively little importance, the fleece,—which is, perhaps, proportionately less diminished in weight,—being the main object.

Experiments are wanting to demonstrate the comparative profits of different breeds of sheep in this country, under any circumstances. Still it may be safe to assume certain points, as that—

1. The Merino is capable of producing a greater weight of wool in proportion to the food consumed, than any other breed.

2. The Merino will better sustain itself on dry, poor pastures, and will bear crowding in large flocks better than the heavy English breeds, though it is not known that they possess any superiority in these respects over the mountain breeds of Wales and Scotland.

3. The Leicester, Cotswold, and the so-called Down breeds, when properly supplied with food, mature and fatten at an earlier age than the Merino. Hence they are more profitable for the market as lambs, and also to be reared for mutton.

In the absence, then, of positive, experimental evidence, it seems reasonable to believe that for keeping in large flocks on rather poor soil, the Merino breed would be most profitable; that for small flocks and good feed, some of the English breeds, reckoning their value in both fleece and carcass, would yield the best returns. The Leicester, Cotswold, South Down, Shropshire

Down, and Oxfordshire Down breeds have been introduced into this country. As to their relative advantages, it is hardly practicable to give definite statements. Formerly, the higher price which South Down mutton commanded in the English markets would nearly balance any extra gain which the long-wooled breeds would give in proportion to the food consumed. The wool of the South Down also brought a higher price per pound. But of late years the price of long wool has been relatively higher, and at the present time that which comes under the denomination of *lustre wool*, produced to a considerable extent by the Cotswolds, but to a greater extent by the Lincolns, brings considerably more per pound than any other wool produced in the kingdom, on account of its special adaptation to what are styled "alpaca goods," the manufacture of which has become very extensive and affords large profits. Measures have been taken within the past year, to introduce the manufacture of this description of goods into this country, and it is probable that the demand for lustre wool here will soon bring the price of it to a point corresponding to that which it brings in England.

It should not be inferred from what I have said that it is proposed to exclusively occupy the land of this section with sheep. There are, doubtless, farms where cattle would yield as much or more profit than any other stock. Butter and cheese have been made in the county to advantage, and no reason can be seen why this may not continue to be the case. I would only suggest that in the selection of cattle, something like the same principle should be acted on as that laid down in regard to sheep. The breed should be chosen according to the soil and climate, and with reference to the special object in view. In England it is becoming more and more the practice to select stock in reference to some leading object. If the farmer believes he can make most money by beef, he directs every thing to that point, and selects his cattle solely with that view. If the dairy is the paramount purpose, a different breed is chosen. It is found that any special quality can be attained in a higher degree by this course than by attempting to combine antagonistic properties in one variety. There is a tendency to this system in this country, and there is no good reason why it should not be adopted here to a considerable extent. If a farmer requires animals of a different kind from those bred by himself, he can readily obtain them from persons by whom they are bred or kept.

The means to be used for keeping up or increasing the fertility and productiveness of the land, require particular consideration. Besides the application of manures, the importance of which in this section will be universally admitted, there are ways of improvement which have not generally received due attention. I allude especially to *drainage and irrigation.* This occasion will hardly permit the presentation of details in regard to the circumstances under which these processes of improvement should be carried on. A brief notice of fundamental principles is all that will be attempted.

Drainage, if not strictly a means of adding to the fertility of the soil, is highly useful in reference to the *development* of fertility. Soil may be rich and yet contain so much water that plants cannot thrive in it; or, in consequence of being overcharged with water, substances unwholesome to vegetation may be formed in the soil. By drainage these noxious substances are decomposed or carried off, and the soil affords to plants their appropriate food.

It is a common impression that as our climate is a dry one, drainage is comparatively unnecessary here. This objection is made without due regard to the effects of drainage. It is a fact abundantly proved that some soils which suffer greatly from drought are rendered by drainage less likely to be affected from that cause. Clayey soils, which do not readily admit the passage of rain water through them, are run into mortar in a wet time, and in a dry time are baked to such a degree that the roots of vegetation cannot extend themselves. The effect of drainage in such cases is to carry off the water, or, in consequence of the openness of the soil and subsoil, to allow the water to sink so fast that it does not pack the soil. Hence, instead of becoming consolidated, the soil remains in a comparatively friable state, in which it not only holds more moisture, but allows plants to extend their roots freely in search of it. As an example of the great advantage that may be derived from draining tenacious soils, I would refer to what has been done in some portions of the State of New York, particularly on the farms of Mr. Johnston, near Geneva, and those of Mr. Swan, Mr. Foster, and others in the same neighborhood. This land, like most of the undrained land in that section, was formerly much affected by drought—the crops on it perished by the extremes of the conditions under which they were placed, being imbedded in mud at one time and in baked clay at another. Now they have at all times a friable loam. The yield of wheat on this land has been increased more than a hundred per cent. by drainage alone, averaging, for several years past, upwards of thirty bushels per acre, and other crops have increased in the same ratio.

Another error which prevails more or less is, that hill lands, or those from which the surface water quickly disappears, need no drainage. It is frequently the case that such lands are too highly charged with water, even to within a short distance from the surface ; and certain trials which have been made demonstrate the great benefit resulting from drains which do not allow the water line to come nearer than two and one-half to three feet of the top of the ground. Indeed, although but little, comparatively, has been done in the drainage of hill lands in Massachusetts, we have examples enough to show that there is no process by which the owner of such lands could more advance his interest.

The principal indications of the necessity of drainage may be enumerated as follows :—

1. It is required wherever the soil is of so tenacious a character that the surface is puddled by rain or baked by drought, or wherever grass or grain is *winter killed.*

2. Wherever what is called *hard pan* (a stratum of impervious earth) comes within two feet of the surface.

3. Wherever aquatic or sub-aquatic plants grow — these always denoting the presence of stagnant water in the soil or subsoil.

Irrigation, as a means of preserving and even increasing the fertility of the soil, demands more attention than it has hitherto received here. Perhaps there is no country where this source of fertility is so much neglected as in ours. There can be no question that water—even the purest water—is not only capable of benefiting crops by the supply of that element, and by its solvent action on other substances, but that it is also capable of imparting actual fertility to the soil. Ample experience has established this fact, although the full explanation of it may not be readily given. It is known, however, from chemical investigation, that water contains some of the most important constituents of plant food—as carbonic acid and ammonia. It is known, too, that the soil has the power of absorbing these substances, and this explains in part, at least, why irrigated lands grow richer. An important reason, therefore, in favor of irrigation, is that all the benefit derived from it is clear gain—nobody, nothing, is the poorer or the worse for it—the result is obtained through an agent which would otherwise have remained idle and unproductive.

In hilly sections, where springs and streams abound, irrigation may be practiced with comparative ease and cheapness. In sections where water is not at all times available, reservoirs might be constructed in which water from rain and snow might be collected at certain seasons, and from which it might be conducted to crops in some cases simply by gravitation. In other cases machinery might be required for its distribution.

A word in regard to land suitable for irrigation may not be out of place in this connection. The remark is sometimes made that such and such land does not need irrigation, because "it is wet enough now." The soil and subsoil may abound in water which is stagnant, or so nearly stagnant, that plants derive no benefit from it, and it may even be the means of *poisoning* the soil by causing a deposit of noxious substances, as compounds of iron and various acids. Drain this soil, so that water will readily pass through it, and irrigation will produce excellent effects. It must be remembered that it is only a portion of the constituents of water that plants feed on, and that when they have taken this portion the remainder, unless it is removed, obstructs the economy of the plant by clogging its feeding organs, so that it is unable to take in congenial food, and finally deranges its functions and produces disease. All these difficulties are obviated at once by proper drainage, which permits the water to pass through the soil with such a degree of motion, that while the plant is able to draw from it its appropriate food, the unwholesome substances in the soil are carried away. Hence, drainage and irrigation must in some instances go together, the former being necessary to the full benefits of the latter.

Such, Mr. President, are, as it seems to me, some of the most prominent points to which the attention of the owners and occupiers of land in this section should be directed. I have purposely confined myself to practical agriculture, presuming that I should not be desired to speak of politics, or war, or even of the poetry of country life, with which many of the people of Berkshire are doubtless as familiar as those of any other section. There are other subjects of more or less importance, that might be spoken of, did the limits to which it is proper to extend this discourse render it expedient. I can only say, in conclusion, that if I have brought out a single idea or hint which can be used by any of the members of this association in augmenting the profits of their labors, or which will in any way tend to the happiness of those who have honored me with their attention, I have accomplished as much as I had reason to anticipate when I accepted the invitation to address you.

# THE FARMER AND THE COMMONWEALTH.

From an Address before the Worcester South Society.

BY S. P. TWISS, OF WORCESTER.

The just and natural relation which exists between the farmer and the Commonwealth, is a subject which commands the serious consideration and reflection of every good citizen. It is essential to the manifold interests of the government, to the welfare of the farmer, and the prosperity of the community in which all or any of the industrial, useful arts and vocations of life are prosecuted, that its agricultural pursuits should be properly appreciated, protected and encouraged by the government, for it is from the products of the earth that man, whatever his condition—be he king upon the highest summit of human fame, or peasant in the most humble walks of life—derives his support and sustenance. Although the importance of agriculture to the body politic, and its support of the institutions of government and society is sometimes not quickly nor easily seen by the careless and superficial observer, yet to the thinking, intelligent man of observation and experience, its obvious import is not easily overestimated.

The agricultural, commercial and manufacturing interests of our country are intimately and inseparably interwoven ; and so great is the dependence of the latter interests upon the former, that a well-founded prospect of a short crop of grass and grain, or potato rot, or a fear that the earth will refuse any of its annual crops, disturbs and agitates the whole mercantile community, the chambers of commerce of our richest and most opulent cities, as well as the most humble laborer, who in depressed and anxious care with his family around his hearthstone, eat their frugal meal earned in the sweat of his brow. All men, all classes of men, all kinds of business, all circles of society, obtain their primary support through the laborer, who with his hand tills the soil, sows the seed, reaps and gathers in the bountiful fruits of the earth. Without the producer, without the working farmer, who can be a consumer?

Many inventions have been sought out and discovered to facilitate and make light the toil of the husbandman in sowing the seed, and in the gathering of the harvests, and so great is the dependence of a free government, and to such an extent does the interest of free people depend upon its agricultural pursuits, that it has been the policy as well as the duty of the general government, from its foundation to the present time, to encourage such useful inventions as would expedite the labor of the farmer, the result of which has been to join the labor of the cunning right hand to that of the well-informed mind, and thereby dignify and lighten the work of the farm. For the promotion of this object, the publication of books and statistics, containing much valuable information and knowledge of the actual, useful experience and observation of the most scientific practical agriculturists, not only of this country, but of all countries, has been prosecuted to such an extent and at such costs, that the agricultural literature of our country is read by as many, and is, at least, as useful to the community as *belles lettres.*

Our fathers, too, in forming the fundamental laws of our Commonwealth, manifested their wisdom and good statesmanship by providing that "it shall be the duty of the legislature and magistrates in all future periods of this Commonwealth, to cherish the interests of literature and the sciences and seminaries of them, public schools and grammar schools in the towns, to encourage private societies and public institutions, rewards and immunities for the promotion of agriculture, to encourage and inculcate the principles of humanity and general benevolence, public and private charity, industry and frugality, honesty and punctuality in their dealing," thus expressing their estimation of the importance of agriculture by placing it side by side with wisdom and knowledge, as well as virtue, without a general diffusion of which among the body of the people, no republic founded on a written constitution can exist in its strength and integrity a single year, as the history of the world sadly but too clearly proves.

And our legislatures, not unmindful of the duty imposed upon them by the Constitution of our State, have, from time to time, with a liberal hand that withholdeth not, appropriated large sums of money to promote the interests, and for the benefit of the farmer they have founded and encouraged various agricultural societies in all parts of the State, and have granted annually no inconsiderable sums of money for the purpose of promoting the objects of these associations. And as a proof that these societies of the farmers have been conducive to the best interests of the people, that the money thus appropriated has been properly expended in carrying out a part of the wise policy of our legislatures, which has made Massachusetts the "Model Productive State," we have only to compare the farming and the farmer of the year 1800, with the farmer and the farming of the year 1863. In the year 1800, much of the soil of this State was comparatively new, in its pristine power and vigor, enriched by the decay of organic matter, by the decay of the primitive forests, by annual vegetation, and the animal remains of numberless ages; and had it then been tilled by the hand of the intelligent, scientific, practical book farmer of the present day, no human mind can adequately estimate the benefits which during the last fifty years would have been conferred upon the people of this Commonwealth.

In the year 1800, the sun of agricultural science had not risen—the dusky gray of its morning was but dimly seen. Some of the statesmen of our country were eagerly looking for and expecting its rise and progress; others were indifferent—thought little and cared less. The recommendation of the first president of this republic to Congress, urging the "advancement of agriculture," remains unnoticed—no action had been taken upon it. Adams on his farm at Quincy, Jefferson on his farm at Monticello, both of whom, knowing the importance of agriculture, being ardently devoted to its interests, had by the few cautious experiments tried by them, begun to see dimly, the rising luminary of the coming century; but the common farmer with no more than ordinary advantages, was then in midnight darkness. With no agricultural books, papers or periodicals, with but little if any reading matter devoted to his interests, he slowly trod in the beaten, shallow track of the wooden plough, made by his fathers before him.

The idea of draining, reclaiming and bringing into productive usefulness the idle and dismal marshes,

> "Where querulous frogs in muddy pools do croak,"

had never entered his head. The uplands which had been cleared of their forest trees for any considerable length of time, were to a great extent exhausted by taking from them their annual crops without returning therefor that reasonable compensation which the unalterable law of all soils requires. Although the farmer saw his lands reduced and turning into wastes, yet he knew not the value of manures; the idea of composts and special manures was then unheard of; wood ashes were of no use except in making soap. He knew not how to retain the vigor of the soil, much less did he know how to restore that which had been lost by reason of his own ignorance.

In the treatment of his live stock he had no intelligent system, and knew little or nothing of that thrifty economy which is now seen in the sleek and growing stock of our intelligent modern farmer. Horses and cattle during the summer months were permitted to take care of themselves, excepting when their immediate services were required by their owners. In the winter months they were so poorly fed and cared for, that the greater portion of the summer months, with an unlimited license to appropriate to their own use such of the spontaneous productions of the earth as were within their reach, was required to regain the lost strength and flesh caused by the ill-treatment of the past winter.

In regard to the cultivation of the annual vegetable products of the soil, the farmer was sadly deficient. The garden was a vegetable patch composed mostly of potatoes and weeds, without peaches, pears, cherries, quinces, grapes or currants. Tomatoes were then unheard of. Apples were then raised, but by far the greater part of them were ground into pomace and then pressed into cider—an orchard of select apple trees was seldom seen. We have now the Baldwin, the Porter, the Jewett's Fine Red, and Hubbardston Nonsuch, (the original seedling tree of which is now standing in its native town of

Hubbardston,) and various other choice apples of recent origin, in the place of the natural and almost wild apple-tree of the last century, which bore fruit fit only for the hardest kind of hard cider and vinegar; in short, the practical result of the difference between the orchards of the last century and the middle of the present is this: the farmer then annually put into his cellar ten or fifteen barrels of cider and a few barrels of poor, knurly apples for his family use, while he now, in the fall of every year, carefully stores in his cellar ten or more barrels of choice, delicious fruit, as a rich luxury for his dinner-table, the healthful, social, refining influence of which upon the members of his family is seen in marked contrast to that of the constant use of the cider mug.

But during the early part of the present century, a new era dawned upon the productive industry of our Commonwealth. Through the agencies of agricultural societies, encouraged and assisted by the legislature, a strong stimulant was added to the cause. Agricultural fairs and cattle shows were held at various places in the State, at which liberal premiums were offered and paid, in the successful encouragement of practical agriculture and the arts, the results of which are seen in every valley, on every hillside, in the cellar, in the garret, and on the table of every intelligent farmer.

The first agricultural society incorporated in this State, is the "Massachusetts Society for Promoting Agriculture." It was the first in the New England States, and was one of the first in the country. With perhaps one exception, it has the oldest charter of any organization of the kind in the country, which is now in existence. Its charter bears date March 7th, 1792, and it is saying no more than is said by those having charge of the Agricultural Department at Washington, to say that no society in the Union has contributed as much as this in promoting the interests of the people by offering rewards, by holding public exhibitions, by importing improved breeds of domestic animals for the use of the State, agricultural implements, machinery of improved construction, the standard works on European agriculture, and in sending agents abroad to acquire agricultural information which might be of use at home. From the date of the charter of the "Massachusetts Society for Promoting Agriculture," the policy of the State has been to promote the material wealth of the people by encouraging such societies and organizations of farmers; and for the last quarter of a century it has been the liberal patron of all societies and associations the object of which has been to promote the interests of the farmer.

During the last five years, the State has appropriated and paid in promoting the cause of agriculture, the following sums:

| | |
|---|---|
| In 1858, the sum of . . . . . . | $82,796 72 |
| In 1859, " " . . . . . . | 33,446 56 |
| In 1860, " " . . . . . . | 29,494 08 |
| In 1861, " " . . . . . . | 34,265 18 |
| In 1862, " " . . . . . . | 33,612 45 |
| Amounting in all to . . . . . . | $163,614 99 |

which has been paid by our State government to promote the interests of the farmer directly, and indirectly the whole people. Who shall say that Massachusetts has been remiss in her duty to the farmer? Who cannot say that she has done her whole duty?

We have now very briefly looked at some of the efforts of the government to encourage the farmer and promote his interests. Let us for a few moments turn to the duty of the farmer to the government. To the farmer it may be said, in your hand to a greater extent than in that of any other man, is placed the destiny, the character, the history of our country. The foundation of our government rests upon the interests which are intrusted to your peculiar care and keeping. You are the dispenser of the staff of life to your fellow-man. "If the earth and the fulness thereof," if "the cattle upon a thousand hills" belong to the King of kings, then it is your duty, as his faithful steward, into whose hand the elements are placed and made to become a part of the general treasure, to know your duty and faithfully to perform it. Every snow-flake, every rain-drop, brings with it a little fertility, and adds a little to your resources. The morning dews which are so quietly absorbed, add to the fertilizing power of your soil. The very breezes which so gently kiss the newly-turned furrow, have something in them which is food and strength to the growing plant. Nature's economy is so perfect that the soil purifies the air, and makes it fitter for respiration, while at the the same time the air is food and strength to the soil. With all these resources in your hands, with all these powers at your command, you should have a keen sense of your responsibilities and duties, and an ardent desire to perform them.

For long years the farmer was patient in his hard toil and labor. With but few tools and those of simple construction, he put his seed into the ground, gathered his harvests, and felt that he had done his duty. But the light of agricultural science has gradually shone in upon his mind, and he has, from year to year, by slow and steady progress, elevated the standard of farm work from a condition which, in many instances, was that of an unlettered drudgery, to the exalted position of high scientific benefaction. Waste swamps, which were once worse than useless, are now reclaimed and made the most profitable part of the farm. The grass and grain annually raised upon these reclaimed lands, are essential and important items in conducting the various duties of life; as many a dray horse who draws the rich merchandise of all parts of the world over the pavements of our populous cities would testify, if he had but the power of speech. Really, "the wilderness shall blossom like the rose," when the hand of industry, directed by the scientific mind is applied even to these dismal abodes of snakes and frogs.

The modern farmer has some knowledge of the nature and qualities of different soils, of the various fertilizers, whether animal, mineral or vegetable, their proper application, and the particular crops to which they can to the best advantage be applied. He also understands something of that economy which secures, retains and returns to the soil the vegetable products which have been taken from it, and the various methods of making and using composts. But in these respects the farmer should be much better educated than he is; he should know more of the nature and composition of his soils, its deficiencies in every one of his fields, and the best method of supplying its wants, by applying just such fertilizing agents as will bring it into the best possible condition for the raising of the crop to which any piece of land is best adapted. In the construction of his house, his barns and other buildings; in the improvement of breeds of cattle, horses and swine; in the use of improved tools and labor-saving machines, and in other scientific attainments whereby the burden of labor is lightened, and in some cases made a pleasure instead of a drudgery, he has made great advances. The mower of various patterns has taken the place of the scythe; the threshing machine the place of the flail, and in nearly all respects his former condition, intellectually, socially and financially, is not to be compared to his present condition. Much has already been done by the farmer, both for his own advantage and for the community, yet much remains to be accomplished. The willing heart, the steady hand, the active and intelligent brain, can make the exhausted soil of New England as fertile as our Western prairies, or the banks of Southern rivers. There is no reason why the soil of New England, yea of Massachusetts, with its towns and cities teeming with the busy hum of its industrious artisans, should not support its own people.

As we have seen, the farmer has made great improvement within the last few years in almost all respects; yet in one respect his course has been such as to be an injury to himself and a disadvantage to the country, as the deteriorated pastures now producing coarse grasses, brakes and bushes, amply testify. The loss of the sheep in such pastures has been an injury to the farmer, and a loss to the country. The farmer's attention should be called to the culture and growth of the sheep as a source of profit and advantage—profit in the annual increase of his flocks, profit in the worth and use of the fleeces, as well as a means of restoring and fertilizing the exhausted pastures which have been greatly reduced in value since the growing of sheep has been quite generally discontinued.

The sheep is peculiarly adapted to the soil and climate of New England, in which more than one-half of all the wool grown in the United States for the last few years has been consumed by the spindle and the loom, and there is no reason why the farmers of New England should not produce annually more wool than our whole country has done. Without regard to the value of the wool, mutton, it is said by good authority, can be produced at market and sold at profit, and at less price per pound than any other meat raised on the farm. Taking into consideration the rapid growth of wool, the duties laid upon it by our government, the prospect of an increasing demand for years to come, with a market near the door of every man for both wool and mutton, the raising of sheep cannot but be profitable to the farmer who may prudently and intelligently prosecute it.

In the year 1855, there were within the limits of this society, 3,704 sheep, that produced 11,810 pounds of wool, a fraction over 3 1-5 pounds per head; while in England, where the growth of sheep and wool has received the special attention of the agriculturists, there were 55,000,000 of sheep, producing 250,000,000 pounds of wool, being a small fraction more than 4 1-2 pounds per head, which fact clearly proves the attention given to the growth of sheep and the profit to be derived from it. And it is for the farmers of this country to say whether or not they will consent to the importation of more than one-half of the wool consumed in the country, with such inducements for its culture and growth before them.

A well-known English agriculturist very clearly and with force expresses the profit and advantage of the culture of the sheep. He says: "The wealth and success of a farmer may be pretty well calculated by the amount of his sheep stock. Sheep are said to be animals with the golden hoof—they enrich as they go. They not only enrich the master but the soil, while you have the mutton, probably as valuable per pound at the end of the sheep's life as beef. It has given him, year after year, the fleece, which is of itself so important, and which in the progress of manufactures in this county I think we have no reason to fear ever seeing at losing prices." What breed of sheep—whether long or short wool, Merino, Saxony, or Southdown—can be raised to best advantage, depends upon the various circumstances of the farmer, and the state of the market for wool and mutton. If the sheep is grown for mutton, then of course the large sheep with its long wool and heavy fleece is to be preferred; but if grown only for the fleece, then the question is determined by the demand for the different qualities of wool and the prices paid for each, as both are indispensably necessary in the making of woollen cloth.

The farmer within the last two and a half years has had sterner duties to perform, sterner trials to contend with, than any which before had been known to our land since the foundation of our government. Well and faithfully has he performed them. The alarum of war broke upon our happy and peaceful homes. Our Capital, bearing the sacred name of the Father of our Country, was in danger. Our President called upon the yeomanry of the loyal States to come to its rescue. With noble patriotism did they respond. Once, twice, three times was Washington menaced and considered in danger. As many times has it been saved by the prompt response of the loyal people.

The farmer, not unlike the farmer of Revolutionary times, left his plough in the furrow, left his all, joined his friends and neighbors, hurried toward Washington through Baltimore on the bloody 19th of April—a day of sacred memory on which the first blood was shed to establish our government and its principles of freedom—the day on which the first blood was shed in their defence against the most ungodly and wicked rebellion that has existed since the revolting angels were consigned to their appropriate perdition—on the plains of Lexington in 1775, in the streets of Baltimore in 1861, blood flowed freely from the veins of Massachusetts men, a willing sacrifice in devotion to the cause of free government.

The farmer has not only furnished men who have fought and won our battles, who have willingly given up their lives in their country's cause, but he has furnished the supplies—which are as essential to the army as the powder, the ball and the rifle—without which, although the army might be armed and equipped, yet it would fade and vanish like the dew before the morning sun.

When the requisition for 300,000 men was made in the busy hay season of 1862, with what alacrity did the farming towns spring to arms. The result how different from that anticipated. It was thought that the cities with their surplus population of traders and mechanics would furnish their quota at once, while of the farming towns it was said, it is a very bad time for them, they cannot furnish their men until the fall; but quite the opposite was the case. The small towns did furnish their men at once, while a number of the large cities did not furnish their quota, if I am informed correctly, until compelled to do it, by the force of the draft.

To-day, as in times of yore, the independent farmer is ready to hazard his life in the service of his country, and to give battle in what he believes to be a just and holy cause. His cattle upon his hills, the fruits of the earth, the toil of his hands, his all, yea, his life, is consecrated to the defence of the cause in which Washington fought and Warren died.

The services which the farmer in furnishing men and supplies has rendered the government, both State and National, within the last two and a half years, has been an ample repayment with interest at a hundred per cent. for all the moneys advanced in promoting the cause of agriculture.

The modern farmer is producing a good effect upon the interests of the community, in forming associations like this, where men, women and children meet upon one common platform, with one common purpose; where for the time the partisan casts aside his partisan feelings, the sectarian forgets his particular creed,—where all, all are harmonious, united and devoted in promoting one of the most ancient and important interests of the people. To the citizens of a free government who have their peculiar party ties and obligations, but come here united in promoting the cause of agricultural science—to an audience like this, it can with justice and great propriety be said—

> "Here none are for a party, here all are for the State,
> Here the rich man helps the poor man, and the poor man helps the great."

# THE FARMER.

From an Address before the Norfolk Agricultural Society.

BY GEORGE PUTNAM.

Having too early in life exchanged the blue frock for one of another color, I do not consider myself, and nobody else will consider me competent to give valuable instruction on the science or the practice of agriculture. I will not attempt it. But though I know little about farming, in its latest and best methods, I think I do know a good deal about the farmer. Therefore I will not speak of tillage, but of the tiller; not of cattle and swine, but their owner; not of land, but the land's lord. We will inquire, not how a man does or should cultivate his fields, but how his fields do and should cultivate him. For it is the case, in any business, that while the man makes the business what it is, the business in turn makes the man, in a great degree, what he is. He directs and moulds that visibly, and that invisibly, but as truly, directs and moulds him. He puts the mark of his mind and character upon that, and that puts its mark upon his mind and character. The influences are reciprocal. Action and reaction are equal.

Farmers are of two classes. The two classes run into each other at the edges, yet are quite distinguishable.

One of the classes consists of persons, not originally, or not exclusively agricultural. They come from other walks of life, from the manufactory, from the counting-house, from the sea, from the professions. Perhaps they have prospered sufficiently, and now only wish to enjoy their gains. Perhaps they have got disgusted with some of the ways of that more excited and adventurous world in which they have been moving, and want to breathe a purer air, and live what seems to them a truer life. Or they are fatigued, and want rest from perplexity and strife. Or they are drawn to the farm by their childish associations with its scenes and doings, or for the realization of a life-long dream of Arcadian simplicity, and rural quietude and felicity. Or drawn, it may be, by a more abstract theory or notion, that the cultivation of the soil, as it was the first, is the most legitimate of human pursuits; that it is best to get very close to mother earth; that if some other employments are artificial, and of doubtful utility, this is surely God's ordinance; that here, if anywhere, is to be found health and invigoration for body and soul, and that it is very good to pass one's declining years, and close them at last, amid these most wholesome and peaceful labors and influences.

By whatever motives this class of farmers is founded and recruited, it is a very valuable class in an agricultural community.

They often bring property into the rural districts, and show what can be done by applying capital to the soil. They are the persons to try new experiments in husbandry; for when they fail in them, they can afford the loss, and when they succeed, poorer men can profit by them as much as they. Coming from more active scenes, with a wide and diversified experience, they bring in and diffuse more liberal views of life and things. They introduce new and often better styles of rural architecture, for houses and barns and fences, and all the farm offices, and new ideas of neatness and good taste, in indoor living and outdoor surroundings. Sometimes a literary and intellectual element and influence accompanies them. They bring in some of the refinements of the city, leaving behind them, for the most part, I think, the follies and vices, and corrupting luxuries of the city. A most useful class it is in many ways.

And the benefit is reciprocal. These men learn as much from their neighbors as they teach, and receive as much good as they impart. They are a favored class. They occupy a position as fair, and with as many of the capabilities of a rational well-being, as the world affords. It is greatly coveted by multitudes who never attain to it. A great portion of the men in cities, men in trade and the professions, believe and hope that finally, when certain objects have been accomplished and a certain time arrives, they shall retire to a farm. A dream, an illusion, it is with many. They cannot do it, or will not,—an illusion, but a pleasant one. They find that the old harness will not come off so easily as they thought, that the bonds of long use and wont hold them with a firmer grip than they supposed. Comparatively few realize their dream.

And of those who do realize it or try it, not all succeed in it. To some the new way of life that looked so beautiful and sufficient in the distance, turns out to be too tame and slow. They find in it privations, annoyances, various drawbacks, that were not foreseen. No earthly condition is perfect, not even this. The experiment fails. They are not contented,

Or perhaps with a shrewd foresight of the possible shortcoming, they have kept some hold of the old way of life, and diversify the monotony of the farm life with some hours weekly, or even daily, spent amid the operations of State Street, or the gossip of the insurance offices, or the din of the factory, or the odors of the wharf and dock, or the court-house, or the commodities and account books of a silent partnership in trade. And wherever this combination of diverse interests is necessary for producing content in the farm life, and does produce it, why is it not well ?

To belong to this class of farmers, and to find contentment in it, by whatever means, whether in itself alone, or by help of its accompaniments and alternatives,—what condition on earth is so beautiful and desirable ? To us who are not in it, it looks like the top of the world, the culmination of human well-being. We should covet it if it were not wicked to covet what is our neighbor's.

The second class of farmers comprises those who from very early life have been inured to the actual labors of the farm, with no other business, or but incidentally, with no habits of life but those of the farm-house. As a class, these men are the healthiest and strongest class in the community. Frugal in their ways of life, and generally temperate in meats and drinks, with habits of early rising and regular industry, they become hardy, capable of much endurance and long-lived, as a class. Farmers, as a class, are as rich as any other class. Take, for instance, all the property of the mercantile class at a fair appraisal, and deduct from the amount what has been sunk in bankruptcy, and then average the remainder among all those who have engaged in mercantile pursuits, and I am confident that average would not exceed that of the whole farming class.

Farming is as profitable on the average as any other pursuit. The same intelligence, industry and moral rectitude and self-control which produce prosperity in other avocations, will produce it in this in an equal degree on the average. In cities and in commerce, money runs more into heaps, and there are greater inequalities. We are deceived by the few instances of great wealth thus acquired. We must look to averages. The heaps are comparatively few and far between. The holes are many, and wide and deep, and a ghastly spectacle of life they present, such as is not to be seen among the green hills of the rural districts, where none, indeed, are very rich, but where even the poorest poor can hardly be said to know what real poverty is.

We find thus among farmers that condition of moderate prosperity and comfortable but limited independence which the wise have always regarded as most favorable to virtue and contentment, to patriotism and good citizenship.

This class of farmers, which for convenience of composition I have called the *second*, is in reality *first* in numbers, in power and national importance. Indeed, it is every way so vastly predominant, that it may be said almost to absorb the other, and I fear it was putting too fine a point on the matter to make the distinction at all.

There is one way of putting this distinction that is inadmissible—that by which the smaller class is sometimes spoken of as gentlemen farmers, the others being plain farmers. Gentlemen are of no one class in society, but are individuals scattered through all classes. Soft hands, rich clothes, and a leisurely or luxurious life do not constitute a man a gentleman, nor the fine language and graceful manners that characterize the more exclusive social circles. The gentlemanly qualities pertain to the soul, and consist of kindly dispositions, the unselfish spirit, forgetting one's self in taking thought for others, acting and speaking in deference to the feelings, wants and interests of others, loving to gratify and benefit them. These qualities naturally express themselves in certain courteous and intrinsically graceful modes or manners, which in the course of time get collected into a code, and are called the manners of a gentleman. Any man favorably situated, can study these manners and practice them, but if he have not the inner qualities of heart, from which they would come unstudied, he is but a counterfeit gentleman, an imitation, and not the genuine thing. The true gentleman, with or without study, will practice what is essential in that high code. The tailor and the dancing master can produce the sham gentleman, but only the kindly and generous spirit of Almighty God possessing the heart, can ever produce the true one, and where that spirit is it cannot fail to produce him.

Accordingly the true gentleman is as likely to be found, and is as often found among plain farmers, so called, as in any rank of society. At any rate, that is my experience. Let me illustrate.

A few weeks ago, I was passing in a light carriage along a narrow country road. Within the space of a mile I met four very broad and heavy loads of grain on their way to the threshing mill. The four drivers were plain farmers, of course, or farm laborers, and strangers to me. Each of the four, on seeing me approach, turned out his team to the very wall, and stopped it; and three out of the four, as I came up, stepped forward, and asked me with a thoughtful solicitude for my convenience, whether I thought there was room enough for me to pass easily. There was room enough, and I passed on, gratified, refreshed, as one always is by any such act or word of a high and beautiful courtesy. And then I called to mind some instances that I have known, of men wearing a garb, and displaying an equipage, and driving at a pace, which they imagined made gentlemen of them, but who, after running down a child or an aged person, rushed on without stopping to inquire what harm they had done, or whether there was any thing they could do about it. Which were the true gentlemen? these elegant men with fast horses and heedless hearts, or those plain teamsters of mine? Perhaps neither. A single cup of cold water given in the name of a disciple, will not make a Christian, and a single act or word of gracious courtesy does not make a gentleman. But this may be said of my teamsters, that if that spirit of courtesy of which I had the benefit were uniform in them, and in the grain; if they do habitually manifest such kindly, unselfish consideration for the convenience and gratification of others, in the intimacies of their homes, by the wayside, with strangers, on all occasions, little and large, and in all the relationships and intercourse of life; if what I saw in them was a fair sample of their style of life,—then they are gentlemen, and would be found on close acquaintance to have all that is essentially graceful and chivalrous in the manners of gentlemen; aye, and would be recognized by all true gentlemen throughout the world, as members of their noble fraternity, the select and God-ordained aristocracy of the race.

But there are weightier matters to consider. I am not here to flatter the farming class. They know well enough already the advantages of their condition, the dignity of their calling, and their supreme importance in the body politic. I would rather ask permission to speak some words of counsel and warning. Claiming at least an honorary membership with the class, by birth, by all the memories of childhood, and by the uninterrupted associations of a lifetime, I shall feel privileged to speak frankly of some of their deficiencies, dangers and duties. There is time but for a single point.

I confess, then, to a feeling of some solicitude respecting the intellectual condition and prospects of the agricultural classes, even in New England.

It has been maintained by some good thinkers that there is something in the life of farm laborers, as a class, less favorable to mental vigor and alertness, than the life of mechanical laborers, for instance, as a class, and that working farmers, as a body, are in fact less intellectual than mechanics, as a body. This alleged inferiority is accounted for in part, by the fact that farmers generally are more solitary in their labors, do not work so much in companies, and have therefore less opportunity and fewer provocations to that constant discussion, and exchange of thoughts, by which intellect is stimulated, sharpened and kept awake. Then again, the work itself of farm laborers, in its ordinary details, though it admits of, does not absolutely require, that concentration of thought, and that active play of the inventive and adaptive faculties, which are required for success in mechanical or commercial pursuits.

And I have heard it maintained further, that there is some influence in continuous field labors, early and late, in summer's heat and winter's cold, that tends to dull the brain, make it sluggish—some physical influence unfavorable to mental activity. In illustration of this view it is asserted that hard-working farmers, as soon as they leave off work to rest, are more irresistibly overcome by sleep than any other classes of workers, have shorter and less wakeful evenings, and of course, are less inclined and less able to fill up their leisure hours with reading or vigorous thinking. I have even heard it remarked that a Sunday congregation composed mostly of farmers, will have more numerous and sounder sleepers in it, than a congregation composed more of mechanics or merchants, not wilfully or by their own fault, but because when they stop to rest, their brain is overcome by an unconquerable stupor induced by the nature of their occupations.

This theory of the deteriorating effect of agricultural labor is a favorite one with the apologists for slavery, enabling them to maintain that the degraded mental condition of plantation slaves is not owing to their being slaves, nor wholly to alleged inferiority of race, but to the necessary influence of field work, continued through a lifetime and from generation to generation.

Our opponents, whether those who represent the slave system, or those who represent the interests of the old world aristocratic system, avail themselves of this theory, to justify their prediction of the sure decay and final downfall of our free labor and democratic polity. Your field workers, they say, must, by the nature of their employment, gravitate towards the peasant condition. And the peasantry, black or white, all the world over, have been, or have become, ignorant, stupid, brutal, incompetent to rule, needing to be ruled. When your working farmers, i. e., the bulk of your population, shall have reached this condition, their rule will be insufferable, and there is the end of your institutions.

To these prophecies of evil, in which the wish is father to the thought, we reply: Look around, look at the facts. Do we not continually meet with practical hard-working farmers, who are among the most intelligent, well-informed men, the most acute and vigorous thinkers, that we find in any class? And the great agricultural masses are not found to be the peril, but the stay and strength of the nation. They are not the men who denounce popular education, or hold back from a liberal support of it. They, as a body, are steady, moderate, loyal, in political action. Not among them is engendered the venom of party politics. It is not this class that the wily demagogue or political adventurer, or minister of treason, can delude and inflame with lies and sophistries, and collect into mobs and madden to plunder and conflagration, and put in riotous and deadly array against the government and laws of their country, or any open or covert co-operation with the banded destroyers of our magnificent civil fabric. That fabric finds its foundation and stability in the practical wisdom, and firm, intelligent patriotism of the agricultural masses. This does not look as if they were grown stupid and brutal, or were sinking to the status of the serfs, and hinds, and boors, or if you will, the peasantry, bond or free, of other communities.

But our adversaries are not silenced yet. They will say that the history of New England has been exceptional among human histories, and that the peculiar circumstances of the founding of our agricultural class, are such as to account for the present and temporary high character and position of that class. There is truth in this. The first farmers of New England were remarkable men. They were not the scum of European serfage. They were men of learning and thought. They came hither inspired and sustained by great principles and lofty aims. They came to found a free empire and a Christian State. They betook themselves to farming here from the necessities of their position. But they were more than mere farmers. They were statesmen. They were theologians. They had borne persecution. They were ready for the greatest sacrifices, for conscience and liberty, and met them all heroically. They were versed in all the great controversies of the time, civil and ecclesiastical. They fathomed the vasty deeps of the theological problems of that day, and men who do that could do any thing intellectually. They studied the Scriptures learnedly, profoundly, devoutly, and that alone is an education.

Such men, being the first possessors and tillers of the soil here, would of course transmit their mental strength and culture, and high tone of character to their posterity and successors. And when the Revolution came, the struggles, sacrifices and responsibilities of that time, would help to keep up, renew and reinvigorate that high tone, for a generation or two more.

But then, our adversaries will say, that extraordinary influence derived from our noble founders cannot last always. It must fade out as those men and times recede farther and farther into the past, and finally disappear, and our farmers, sinking into the ignorant and cloddish condition which always and everywhere pertains to their employment, gravitate to the bottom of the social scale. The laws of nature, as manifested in all past experience, must go into effect at length, and farm laborers here, as elsewhere, become boors—a peasantry—and that must be the end of the Republic.

We will not give in to this reasoning, nor anticipate any such result. Nevertheless it is wise to learn something of an enemy, and set up all possible barriers against the fulfilment of evil prophecies.

Whatever may be the philosophy of it, I am inclined to think there is some ground in facts—not much perhaps, but some—for the opinion that farming labors are somewhat unfavorable to mental development, as compared with some other pursuits; and dropping all comparisons, which are disagreeable and inconclusive, all farmers know, or should know, that they need to take great pains to overcome the dulling tendencies of their long, continuous field labors.

Let us consider the means of overcoming these unfavorable tendencies, in whatever degree, large or small, they may be admitted to exist.

And of course, among the means of mental culture and advancement, we think first of our system of free schools, the pride and hope of the land. We cannot prize them too much, nor compute the benefits of them. It would be a mistake, however, to suppose, that the mere going to school, summer and winter, or even the whole year through childhood and early youth, however good the schools, or however well-improved the opportunities they afford, will make the pupils intellectual, progressive, live-minded people, after they have become men and women. The schools taught us, when we were young, to read, write and cipher, and the best schools cannot do much more. That is all very well, very important. But it is by no means enough to know *how* to read, write and cipher. The question is *do* we read, write and cipher, and keep on doing it after we have grown up?

Do we read? for instance—that is, establish and maintain open and large communication with the world of mind, and keep taking in knowledge, light, strength and inspiration, from all those, the multitude of the living and the dead, who stand ready to supply them to us through books? Do we read, or only rest content with knowing how to read?

And do we write?—that is, do we possess and exercise the faculty and habit of giving a connected and visible expression to our thoughts? To make out a bill of sale and sign one's name to it is not writing, in any intellectual sense of the word. To think clearly, logically, connectedly, and be able to put down one's thought and feeling in fair grammatical sentences, so as to communicate the thought and feeling from one mind to another—that is alone writing. And what proportion of the farming class, or indeed of almost any class, do that, or can do it?

And then do we cipher? That means something more than doing, or having once done, the sums in the school arithmetic, or being able to foot up a column of figures, or cast the interest on a promissory note. It means, or ought to mean, the keeping our powers of calculation, of analysis, and of severe, accurate reasoning, in vigorous and habitual exercise. Mere school-ciphering is not worth much, as mental culture, except as a preparation for this.

When farmers do actually read, write, and cipher, as well as they know how, they may consider that their minds are getting well educated, and not before—neither farmers nor anybody else.

I should say that a farm itself contains and presents opportunities for mental culture, and of the noblest sort too. To carry on a farm with a high intelligence and in the best manner, observing all the facts, and studying the capacities and adaptations of soils, seasons, weathers, winds, markets, keeping an ear open to all suggested improvements, and a mind keenly discriminating between the real ones and the seeming, to master what is valuable in agricultural science, and make that science practical, concrete it into methods, and crops, and tools, and manures, and fields, brought to the highest state of beauty and productiveness—to do that is itself an education. To do that will keep stupidity out of a man's brain, if any thing can. A farm so conducted,—that is, a farm with a live mind on it,—is as good a college to enter and graduate in, as any in the land. Cultivate your farm thoroughly, and your farm will cultivate you nobly. Make your farm in the best sense, and at all points, a first-rate farm, and the farm will make a first-rate man of you, as to your intellect and as far as in you lies. Mind geared on to matter, brains mixed with the soil, thought coupled with labor—that makes a farm, and also a man ; and a class of men fit to rule a nation, and give tone and elevation to the politics of the world.

And beyond the mere theory and practice of farming, any country town, though secluded, and without any rich institutions in it, or any celebrity about it, is as good a university as ever was endowed by God or man, for training willing minds to power and vitality, and imparting to them the truths of science, and the facts and inspirations of nature.

Any one of the retired and quiet agricultural towns of this county—Dover, Wrentham, Needham—is a part of God's glorious universe, and displays as much of his creative power and providential care, as any other part. Nature unfolds her wise and beautiful mysteries there as amply as anywhere. And there are eyes there capable of seeing them, and brains to search them out, and souls to admire and grow up to them. Needham has as large an outdoors to it, and over it, as any other place of its size on either continent. What more would you have ? Look ! All the astronomy that Newton or Leverrier ever knew, or that such as they, the giants of science, ever will know, is rolling and shining over your heads there every night. The whole charming science of botany lies there spread out in the flowers and grasses that adorn your hills, and meadows, and woods, and moving on in their wondrous processes of germination, and growth, and maturing. There are trees in the town, and the young man who should make a thorough study of a single one of them, and understand it, all it can teach, its whole physiology, how it grows, the laws of it, the mysteries of it—know all—would be deemed a learned man in any scientific convention that ever assembled. There is all geology there under your feet, open to your inspection, ready to carry you back in knowledge to the flood, and beyond it, and to show you all the secrets and marvels of creation that the Lyells and Bucklands have ever written about. In your fields, and forests, and waters, and the air, there is a chance for the patient and intelligent observer to learn so much of animal life in its various structures and habits that he shall feel perfectly at home in Agassiz's great museum of zoölogy, knowing already half that can be taught there, and quite prepared to take in the other half.

It might be an excellent thing, and certainly not a new thing, for the young people of a farming town, those of them who want to be educated and want to keep the dust, and mud, and brush, and cobwebs of the farm out of their brains, to form themselves into an association for the purpose of learning together with mutual hopefulness and stimulation, so much of nature and science as they have the materials for right about them. They could easily come at the necessary books and apparatus. They could find time, or make it, as all live and earnest people can. They have eyes, and ears, and minds; they can read, write, and cipher. And that is enough to start with. The world of knowledge is before them, on the spot, at their very doors, over their heads and under their feet.

Finally, over and above the ordinary and universal means of intellectual development, the Divine Providence, now and then, prepares extraordinary means to the same end, in those social convulsions and calamities that shake whole nations with the mighty upheavals of thought and passion. I have already referred to an influence of that kind as experienced by our fathers in the circumstances of the settlement of New England, and again in the Revolution, an influence not transient, but long transmitted. And now, after a long interval of national quiet, it is being repeated under circumstances different, but not less grand and awful. A war of secession and disintegration is upon us. The nation's integrity and its very life are at stake. It is an epoch that the most sluggish minds cannot sleep through. They who never thought before, must think now. They who never felt before, must feel now. The intellect of the nation is aroused in the presence of this immense issue. It is an educational epoch. Its perils, trials, sacrifices, are the school-discipline of God. The mind of the people grows up whole cubits of stature in a short time. The heart of the people is moved to its deepest depths, of all classes, but most of the most numerous and the governing class, the agricultural. And the heart is always the head's best ally. Deep feeling begets strong thinking. Sentiments of patriotism and loyalty, new-born and fervid, awaken and reinforce the intellect, raise up character, enlarge the whole man.

In the summer of last year, when the recruiting for the volunteer regiments was in progress, spending some weeks in one of our interior counties, I had occasion to attend meetings—town meetings, mass meetings—in several small farming towns—meetings called for promoting enlistments. The fires of patriotic ardor had reached them, and were all ablaze. The people, nearly all farmers, had risen up into sympathy with the grandeur of the time. And there was no faltering or halting in the determination to meet the crisis like men. The cowardly and half-hearted, the disloyal, the fault-finding, the abettors of treason, the advocate of base surrender, and of that peace-at-any-price, which is but the inauguration of eternal strife—men more anxious to save a party than to save their country—and so could make a mock of that country's perils and distresses,—such men, if such there are in such communities, and I think there are fewer of them there than almost any where else, were not present at those meetings, or, if present, they slunk away, into corners, sullen and silent, unheeded and alone. But the sacred demands of the time found abundant voice.

Men all unused to public speech, more accustomed to address their flocks and herds, than assemblies of men, had their tongues loosed, as by the forked flames of a new Pentecost, and spoke with a sublime and touching eloquence, although they knew it not for eloquence, because of its simplicity. Hands, hard and stiff from the plough and scythe, and looking little fit for such an office, were stretched out in effective appeal. They told the story of the fathers, what they did and suffered in the Revolution. They spoke of the immeasurable value of the Union, the Government, and the Constitution, how it was worth all the blood or treasure we could pay for it. They voted their money—little enough they had, and hard-earned—voted it freely as water. They called on their young men to take up arms. Old men cheered their sons, as they walked up to sign the roll. In more than a single instance I saw an old farmer bent with years and toil, with weeping and trembling speech, bid his only son God-speed, though it was his all, his only stay and staff, needful enough to him in the hard winter of his age and his poverty.

I tell you, I knew then, if I had heard it doubted, or had felt a doubt before, that the mind of the farming class is still capable of the highest vigor and elevation. If it has been growing stagnant and torpid, or seeming so, there is deep, strong life beneath the surface; and if there was any tendency to declension, it has been stayed, by this dread calamity, that exhibits at once the severity and the goodness of God.

And this reviving and reinvigorating influence will not pass away with the trials that produced it. When God educates, it is not for a day, but for generations. When he quickens a new life in the soul of a people, it is a life that lasts. When he touches the human harp with his own mighty but tender hand, the sound remains in the strings for an age, and for ages.

Long after this war shall have closed, and its distresses passed away, its moral and intellectual compensations will remain. Every village will have its war-worn veterans to tell the story of Antietam, and Gettysburg, and Port Hudson, and many another field of daring and achievement. Almost every farm-house in the land will have its sacred and inspiring memories of a father, son or brother, who fought for his country, whom they, and their posterity after them, must henceforth love and take thought for as their very mother.

And every village graveyard will have its green mounds, that shall need no storied monuments to clothe them with a peculiar consecration—graves that hold the dust of heroes—graves that all men will approach with reverent steps—graves out of whose solemn silence shall whisper inspiring voices, telling the young from generation to generation, how great is their country's worth and cost, and how beautiful and noble it was to die for it.

# FARMS.

## ESSEX.

*From the Report of the Committee.*

The agriculture of the county has received rather more than usual attention during the last season; and notwithstanding the difficulty and expense of obtaining labor, the results have been highly satisfactory. The season has not been entirely propitious, it is true; the early drought and the later floods having interfered very much with some of the most important farming processes. But, nevertheless, our crops have been, in many instances, abundant, and it is seldom that the markets have afforded better advantages. The fruit crop has been nearly a failure. Small grains have suffered much from drought and subsequent rains. Root crops, which are beginning to be extensively cultivated, are abundant. The quantity of hay cut, whatever may be its quality, is not below the average. And at no time have our pastures produced such a luxuriance of herbage. Our farmers commence the winter with well-stored barns, and their cattle in unusually good condition. It is doubtful whether the 150,000 acres of land in the county, employed for farming purposes, have ever yielded a larger return for the labor bestowed upon them.

The enterprise of our farmers and their interest in their calling have not abated. In addition to the Agricultural Society which has been so long established in the county, and has enlisted the services of some of our most useful, influential and public-spirited citizens, we have now two town associations, both in flourishing condition, and three farmers' clubs, diligently devoted to the investigation of topics belonging to practical agriculture. Various sections of Massachusetts, and of other New England States, have supplied themselves with many valuable cattle of pure blood, particularly Ayrshires for the dairy, from the breeders of Essex. The three-year-old stallion, which took the first premium this season at one of the largest exhibitions in Vermont, was bred in this county, as were his sire and grandsire before him. Some fine specimens of Short-horn blood have been brought to our notice this year; descended from one of the best bulls of this class in New England, and introduced into our section of the county two years since. The interest in sheep husbandry has materially increased; and, for the first time for many years, fine-wooled sheep have been introduced among us from the various families of Vermont Merinos.

We mention these facts, as proofs that our agricultural enterprise is not on the wane. The various root crops of our county still hold the high position they have so long held among the cultivated crops of Massachusetts. The cultivation of fruit is still pursued with untiring diligence. The hay crop of Essex county fills its usually important place in the market. And in addition to all this well-known and recognized industry, we add with pleasure the new evidence of skill and attention which has been brought to our notice.

Machinery.—One great obstacle in the way of profitable agriculture at the present time, is the scarcity of labor. Wages of farm hands have increased to such a degree, during the past year, that it seemed at one time as if the earth must be abandoned to its spontaneous productions. In this condition of affairs, the importance of good labor-saving farm machinery becomes very apparent. The stout, and heavy, and unwieldy weapons, with which our ancestors subdued the wilderness, were useful enough when wielded by their own strong arms, whose strength was increased by a firm will and vigorous industry. But we can no more employ such implements in any modern profitable agriculture, than we could substitute the hand-labor of China for our own well-ordered and powerful engines. It is one of the most important questions which the farmer is called upon to decide—how far he can devote his capital to the best farm machinery?

It is indeed doubtful whether any machine can be employed in tilling the earth, in digging and manipulating the soil, in applying manure, in sowing seed, in harvesting, with so good an effect as that produced by the hand of the skilful husbandman. But this can be applied only to small tracts of land, unless by the employment of a large and expensive force. We must resort, then, to such machinery as will enable us to carry on our business economically and profitably.

Perhaps the time has not yet arrived when we can equip our farms with all the intricate implements which constitute a part of the outfit of an English farmer. We can, however, employ with advantage the improvements which have been made by the skill of our own people. In all the smaller tools, there is no doubt that we are far in advance of any other nation. Our shovels, and spades, and forks, and hoes, and rakes are light, well-balanced, and, when carefully made, very strong and durable. No American farmer would think it possible to carry on his farm with the implements used in most parts of Europe. At the recent International Exhibition at Hamburg, the steel-tined pitch-forks exhibited by American manufacturers, were examined with fear and trembling by the German farmers, who considered them dangerous instruments, when compared with their own clumsy, and by no means formidable wooden forks, used by them in their hay-fields and farm-yards. We need not complain of our smaller agricultural tools, when compared with those of any other nation.

Perhaps the same may be said of our ploughs, upon the construction of which we have devoted so much time and skilful attention, during the last quarter of a century. It is a fact worthy of notice, however, that the American, who claims to have the best plough that can be made, is by no means the best ploughman. In this respect, many other people excel us; the Italian somewhat, even with his rude implement, and the Scotchman very considerably, with his model plough for heavy lands. That straight and even furrow, so characteristic of the farming of the latter, is but little known to us. And we would suggest that for ploughing our heaviest and strongest lands, the length of our ploughs from heel to point should be materially increased, and with it the length of the mould-board; believing as we do, that a plough thus constructed is more easily handled by an unskilful laborer, than one which is shorter, lighter, and more difficult to control.

Not so much in our plough, however, may any improvement be made for the benefit of those deficient in skill, as in those implements employed for pulverizing and cleaning the land. These are very important to the farmer who is engaged in raising roots, or any other crops which require careful cultivation. We need very much a convenient and effectual grubber and horse hoe; one which can be used previously to planting, to rid the land of weeds and grass roots; and afterwards among the plants for stirring the soil and keeping it clean. We need a light, and cheap, and easily-handled dibble, for seeding our turnips, and mangolds and carrots. This of itself would save great labor in the outset; but we need still more some implement which will take the place of that great number of hands which we must now employ in weeding and thinning these crops.

Of the machinery now used in haymaking, we have a very good supply. The construction of the mowing-machine has gone so far, as to leave hardly any thing to be desired in the way of improvement. And the skill of the farmer in its use has kept pace with the invention of the mechanic in its construction. It will not be an easy matter to improve our mowing-machines.

We wish we could say as much of the horse-rakes and tedders, which are in use among us. The problem of horse-rakes remains to be solved. It is unfortunate that the "revolving rake," with all its difficulty of management, should still stand very high on the list—in the estimation of many, who like clean-raked lands, and hay free from dust,—the highest. It is unfortunate, also, that the mechanism of a tedder, which will work easily, with light draft, and effectually, should apparently be so difficult to devise. But so it seems to be.

For loading hay in the field, it will probably be difficult to invent a machine superior to a strong arm with a good fork. But for unloading hay in the barn, we would direct the attention of our farmers to "Wheeler & Merrick's Excelsior Pitchfork." It is simple in its construction, can be managed by any able-bodied farm hand; and not only saves the heating and exhausting labor of pitching hay from a load, in a close barn, and perhaps to a great height, but it avoids the necessity of employing a large number of men in stowing hay, and in passing it from one part of the building to another. It is difficult to estimate the precise amount of labor which it will save. It is certain, however, that in raising a ton of hay to the top of a well-filled mow, it can perform the labor of three able-bodied men, and save the time of three more. And more than all, when it is generally introduced, we shall see no more of those permanent scaffolds over the driveway of our barns, which, with their narrow scuttle-holes, are the most inconvenient design which ever "entered the heart of man to conceive." And this brings us to the consideration of our

Farm Buildings.—We do not propose to discuss the dwellings of the farmers of the county; for the location and style, and adornment of these structures depend so much upon the taste of the builder, and are intended so much to gratify taste as well as to conform to convenience, that no rules relating to them are easily laid down. With regard to the farm buildings proper, those buildings intended to shelter the animals and to store the crops of the farm, something more definite may be said. They should be as compact, and at the same time as commodious as possible. It is important to avoid as much as may be, all extravagance of roofing, for the roof is the most expensive part of the building to keep in repair. Whether the building be a stable, or a piggery, or a granary, or a barn, economy of roof should be one of the first considerations. It would be well to cover all these offices referred to, with one roof if possible. This may be done to a very considerable extent, by a properly-arranged barn with a cellar.

Such a barn as this is rarely seen. There are many buildings erected for the purposes of a barn, which are more remarkable for their intricate and labyrinthine passages, and their inconvenient arrangements than for any thing else. In structures like these, the visitor is constantly astonished with some new and unexpected receptacle for hay, or some suddenly-discovered retreat for a few cattle, or a concealed stall or two for horses, or a bit of a cellar, just where a cellar was least anticipated. He is never impressed with the simplicity, and convenience and capacity of the building, never surprised to find how many cattle can find shelter in it, nor what ample storage it furnishes for hay, grain, etc. And yet this is the great requisite for a barn.

In the cellar of a well-designed barn, can be found room for the deposit of manure, the storage of roots, and the shelter of swine. In the building itself, it is easy to arrange a granary, stalls for horses, and accommodations for cattle. The mows, bays, and space over the driveway, may be filled with hay, and whatever buildings may be required on the farm for sheep, or poultry, or for the protection of carts, wagons, etc., may be connected with it. A multiplication of buildings is always a misfortune to the farmer. It increases the original cost of construction, and the expense of keeping in repair. And it must necessarily require more labor, than a single, compact, and simple arrangement, where no great distance is to be traversed, and where every thing is within easy reach.

A barn of parallelogram shape, forty-two feet wide, and of indefinite length, with entrance at one end, and exit at the other, furnishes the best accommodations, and the best opportunity for all sorts of conveniences, of any building that has been brought under our notice. Such a barn as this can be extended, without fear of destroying its convenience. A barn, constructed on this plan, comprises all that can be required for managing a farm, with the exception of those matters immediately connected with the house. Such a barn is the most useful and economical building which a farmer can erect, capable as it is of covering his crops, his cattle, and his manure.

Crops.—The crops in the county, during the last season, have been, in most cases, abundant. Small grain, especially barley, has suffered much; the seed germinating slowly on account of the spring drought, and the heavy mid-summer rains preventing the berry from reaching full maturity. The barley crop, one most adapted to the soil of this county, has suffered to the extent of one-third of the average yield. Wheat has done well in many places. Winter rye gave a good yield. Corn did remarkably well, considering the wet season; filling rapidly in the warm days of early autumn. Root crops have been abundant, wherever the seed had a good opportunity to germinate. The size and quality of the mangolds and ruta bagas of this year have seldom been surpassed. Late-sown English turnips have reached an unusual size. The onion crop has begun to regain its former excellence, before the days of the maggot; and at the present prices, it has been exceedingly remunerative. The failure of the crop of squashes, very generally in the county, constitutes one of the peculiar features in our farming this year; and in view of this fact, we would call the attention of the society, and of cultivators generally, to the statement of Mr. J. J. H. Gregory, of Marblehead, whose large crop of Turban squashes bears favorable testimony to his skilful mode of cultivation. Although the fruit crop has also failed, still the earth has yielded bounteously to the husbandman; and an unusually active market has enabled him to overcome the obstacles which scanty and expensive labor has thrown in his way. It is a fact worthy of notice that the markets of Maryland have been supplied this autumn with beets, turnips, carrots and cabbages from the farms of Essex County.

The great agricultural trial among us this year, has been the securing of our hay crop. In the early part of the season grass was so light as to promise, even on the best field, hardly more than half a crop, and that too, hay of a half-matured and very inferior quality. It was not until the haying season had begun, and, with some of the small farmers, had gone, that the grass began to grow. And the unusual and extraordinary spectacle was presented in August, of a scanty crop of herds-grass already over ripe, through which was growing another thick and luxuriant crop, destined to constitute a large part of the hay of the season. And even this latter growth came to maturity, before the rains were over, and an opportunity was furnished for late hay-making. The second crop on well-cultivated fields was very large. From the first of August onward, grass grew apace. Pastures became suddenly luxuriant. Fall feed has been more than sufficient for all our wants. And the extraordinary warmth of autumn has continued on into the winter months. On the third of December, at the time of writing this, store cattle, horses and sheep find abundant feed in the pastures and fields, and weather mild enough for their out-door subsistence. And at this date, we know of no dairy stock which has been permanently housed for the winter. It would be difficult to estimate the amount of fodder, grain, roots, etc., which our farmers have saved through this beneficent order of Providence. The stock of hay, inferior and damaged as it may be, will undoubtedly be more than sufficient for the wants of the season thus fortunately shortened.

The importance and value of the hay crop induces us to enter into a consideration of the various modes of cutting and curing it. The best grasses known to us are undoubtedly herds-grass and redtop. Clover serves as a good introduction to better grasses, on land just laid down—nothing more. There are heavy clay lands in some parts of the county, where redtop never appears, or at any rate, never reaches maturity, even if the seed be carefully sown. On the lighter lands it constitutes one of the most useful and beautiful of our grass crops. Herds-grass, or Timothy, is, however, the recognized leading grass ; that grass which yields the largest burden of good hay on well-cultivated lands, and furnishes, when well-cured, the best fodder for our cattle and horses.

It is very important, therefore, that we should ascertain, so far as may be, the best time for cutting and the best mode of curing this valuable grass; so that it may furnish the feeder with the largest amount of nourishment for his animals. We are not now considering the kind of hay which will make the most milk, or is best adapted to calves, colts, and young stock generally, or will be the permanent food of sheep. We desire to learn if possible, that condition of herds-grass hay, which will supply the largest amount of those elements which make animal fibre, fat, bones, and muscle.

We do not think that hay which, when cured, bears a resemblance to "rowen," will do this. We have no doubt that animals fed on hay of this description will thrive well, when lavishly fed upon it. We have no doubt that cattle fed on such hay have a larger reserved capacity for consuming corn and other grain, than when fed on hay of a maturer quality. The capacity of cattle for consuming "rowen" seems to be unlimited. And it is generally understood that it is not a profitable or an economical kind of hay to feed ; and that it requires a liberal additional supply of grain when it is used in the process of stall feeding.

The great object of the feeder should be to have his hay in such condition, as to avoid an excessive amount of grain. The hay that "spends the best" is the most valuable. A hundred weight of hay which will produce as much fat with a bushel of corn meal, as a hundred weight of hay of different quality will, with two bushels, is certainly the more profitable for the farmer, whether he feeds his animals for labor or for fat. This no one will deny. That hay, moreover, which shrinks the least after cutting, and at the same time retains all its nutritive qualities, is the most profitable and desirable, to all who would make the most of their crops.

We think there is a period in the growth of herds-grass, when it reaches its maximum in this respect—when it contains all the elements it is capable of supplying the animal which consumes it. But this is not when it is half-grown; when the head is half-formed; when it has no well-organized fibre to give it strength and consistency. It is not when it is in blossom. For at both these periods it is deficient in starch, and sugar, and gluten, the most important of its nutritive elements; and it abounds with water. It is in fact immature, and is in the condition of an unripe apple or potato, or any other plant, or fruit, or root, which is half-grown, and half-organized.

We do not mean to contend that grass should be "ripe" before it is cut; for the change which takes place in the stalk of all grasses which bear seeds or grain, when the seed becomes mature, and fit for reproduction, is such as to deprive them of a large portion of their nutritive elements, and to leave a large preponderance of woody, indigestible matter. The plant has then reached a period when its decay begins, and when its value consists very much in the seed which it has borne.

There is a period, however, when the seed is fully formed, and is yet "in the milk" as it is termed, during which grasses contain more nourishment, including that found in the stalk, leaves, and seeds, than at any other. This is the time when we think herds-grass ought to be cut. It has then, "more heart in it," —to use a common farming expression; not only is the grass itself more thoroughly organized, but the seed also, which, in well-grown herds-grass, is abundant, contains a large amount of nourishment, being equal, in this respect, to grain of any kind, weight for weight. Experience has taught us that grass cut at this period of its growth, and properly cured, makes hay of the highest quality. Cattle that have been fattened, with the smallest expense for grain, have been fed on such hay. We have seen horses, performing constant service, in good, hard, muscular, working condition, as if supplied with corn, fed on such hay alone.

We are well aware that much of our grass stands too long, especially on large farms, where a great amount of hay is to be cut. This may render it necessary, in some cases, to commence cutting the grass before it is in proper condition. But even in such cases it is not the earliest cut, nor the latest which is the best. It is that, which, when cured, has neither the succulent weakness of rowen, nor the hard and woody fibre of straw; but that which has the firmness, and consistency, and color, and quality, which all men understand, who know by necessary experience and observation, what is the most nutritious and economical hay which they can purchase in the market.

Cattle and Sheep.—The attention of our farmers is turned now more than ever to their cattle. There is an increasing interest in the question, what breed is best adapted to our soil, and in many places great improvements have been made. It begins to be more and more understood that size is not always a test of merit; that quality is better than quantity; and that there is no more mistaken economy than an attempt to feed an animal on pastures unsuited to it. Compact, solid, thrifty oxen; cows whose bony structure does not overbalance their muscular, and which have not a superabundance of offal; sheep which are "heavy in proportion to their size," have great attractions to those who cultivate a hard soil, under a cold sky. They are animals which can be profitably fed for work, or for milk; and are the only animals that can be fed here for meat, without a loss. There are still, however, too many unprofitable animals in the county—animals which make no fair return for the food which they consume. He who produces an early and hardy variety of corn, he who discovers a valuable fruit, he who introduces a desirable vegetable, he who hybridizes grapes successfully, is looked upon as a benefactor to the tillers of the soil. What shall be said of him who introduces the best class of animals to our farms, and lays the foundation of that business by which corn, and fruit, and vegetables, are produced?

The newly-awakened interest in sheep is also an encouraging feature in the agriculture of the county. There are already small flocks which are very profitable; and there are indications that sheep-husbandry will, ere long, form an important branch of our farming. The comparative merits of fine and coarse-wooled sheep have been somewhat vigorously discussed among us, especially since the attention of this society was called to the subject, by a report of a committee on sheep, made in 1862.

Manures.—Probably no section of the State supplies itself with manures from so many sources, as do the farmers of Essex County. The accumulated refuse of our cities, the contents of sand-heaps and muck-beds, the collections in the farm-yard, the marine plants which storms cast upon our shore, and the various concentrated fertilizers are all liberally used. In those towns where the heaviest crops of roots are raised a diligence and care which would astonish even the Japanese farmer, are displayed in collecting fertilizing materials. Notwithstanding all this, there is room for improvement in the methods by which manures are manufactured, collected and used. Since the extravagant nitrogen theory of Liebig has exploded, we may be sure that the substantial manures of our farm-yards have all the value, which we have been in the habit of attaching to them. And we cannot be too attentive to all the processes of composting and of decomposition, by which green manure is passed safely through the work of putrefaction, and rendered useful to the growing plant. If we will protect the manure of our farm-yards, from the wasting influences of sun and rain, we may assure ourselves that we have all that is necessary for the best cultivation of our crops. It furnishes the best pabulum for our corn-crop, and is unequalled in the power which it posesses of rendering land peculiarly adapted to the growing of grass. Let every farmer, then, have a cellar or a manure shed, and he may become independent of all artificial stimulants, and may derive from his farm, all those elements which he requires for the best cultivation of land.

Geo. B. Loring, *Chairman.*

## NORFOLK.

### *Report of the Supervisory Committee.*

The Supervisory Committee for the Norfolk Agricultural Society, in submitting their report for the year 1863, deem it proper to notice some facts connected with the season which influenced, more or less, agricultural productions.

The winter of 1862–3 was the most mild that has occurred for several years. There was but little snow during the winter months; but soon after the first of March enough fell to make good sleighing, and it remained till near the close of the month. The mean temperature for March was several degrees lower than that of either of the three months immediately preceding, and nearly all the ice which was stored for summer was formed during this month. Thus the respective characters of winter and spring were to some extent reversed.

It was feared that the openness of the winter would be unfavorable to grass and winter grain ; but the injury proved to be not greater than is usually experienced. Probably the exemption was due chiefly to the covering of snow during March, and the even temperature of that month, March being usually the most critical in reference to the crops alluded to. The destruction of grain and grass by the upheaving action of frost, or by alternate thawing and freezing—usually termed "winter killing" —might with more propriety be termed *spring killing*, as it is generally in the early part of spring that freezing and thawing succeed each other most frequently.

The season opened rather late. May and June were quite dry, and July commenced so, giving rise to fears of a scanty hay-crop from drought ; but on the 8th of the latter month, the drought was broken by a moderate rain, which was soon followed by others more copious, and before the close of the month upwards of twelve inches of water fell, flooding much of the grass land of this section, retarding the process of hay-making, and doing great damage to hay in the field. The month will be long remembered as the "wet July." In consequence of so much wet weather, the hay-crop, though abundant in quantity, was generally of inferior quality. It is proper to say, however, in this connection, that where *hay caps* were used the hay was much less damaged ; and from all the evidence we have been able to obtain, we believe these articles can be economically used by farmers in the protection of their hay.

August was much more wet than the average for that month ; the low grass lands being so frequently overflowed that they could not be mowed, and the hay-harvest was prolonged, in many instances, into September, the first and the after growth being then cut together. The constant supply of moisture, however, had the effect to keep up the growth of grass, and the result was that on uplands, where the first crop was cut at the usual time, a large crop of rowen was obtained, which, where it was well cured, went far to balance the damage done to the first crop.

The season continued wet to the close. Professor G. P. Bond has kindly furnished for this report the annexed table, showing the monthly fall of water, in rain and snow, at the observatory of Cambridge College, for the year 1863 : —

| | | | | | |
|---|---|---|---|---|---|
| January, . . . . | 4.427 | inches. | July, . . . . . . | 12.426 | inches. |
| February, . . . | 1.634 | " | August, . . . . | 5.567 | " |
| March, . . . . | 2.457 | " | September, . . . | 2.983 | " |
| April, . . . . . | 7.391 | " | October, . . . . | 3.401 | " |
| May, . . . . . | 1.672 | " | November, . . . | 6.536 | " |
| June, . . . . . | 2.470 | " | December, . . . | 5.457 | " |

Making a total of 56.417 inches, which is 13.411 inches more than the yearly average for 34 years. We have now had two consecutive years in which the quantity of rain has been considerably greater than the general average.

But while this section of the country has been thus copiously watered, some other sections, particularly the North-western States, have been so scantily supplied that many crops suffered from drought. The latter section was also visited by untimely frosts, which cut off the Indian corn crop to such an extent that the price of that grain has been, and still is, higher in the eastern markets than it has been for many years previously. It is worthy of note that at the time the damaging frosts occurred at the West, viz.: on the 17th and 18th of July, and the 30th and 31st of August, there was none to injure vegetation eastward of Lake Erie.

The visits of the committee to farms, have not been as numerous during the season of 1863, as in some former years. We had one entry for the premium offered for the best-cultivated farm, viz.: that of Walter H. Fisher, of Franklin. Some remarks in regard to this farm will be found in another part of this report.

The committee made a brief visit to the farm of E. W. Clap, of Walpole. It consists of about 500 acres, a large proportion of which is woodland. About 100 acres, comprising the homestead, is of superior quality, naturally, and being well-cultivated, is very productive. A barn 100 feet long, 40 feet wide, with posts 24 feet high, was erected by Mr. C. in 1861, and in connection with its appurtenances, is one of the best in the county —we might say, in any part of the country. There is a cellar under the whole of it, 9½ feet deep, the bottom of which is overlaid with hydraulic cement. The cellar opens to the south-east, on which side, and attached to the whole length of the barn, is a row of pens for swine. The floor of the pens is several feet above that of the cellar. Sections of the pens can be readily raised by pulleys to admit the passage of teams to the cellar. The cellar is divided crosswise by plank partitions, extending from the divisions between the pens to the rear wall. This gives to the inmates of each pen a portion of cellar-room.

The main object of this arrangement is to keep the hogs, for a certain portion of the time, on the manure made by the stock, which is kept in the barn above. By this means the hogs mix with the manure the materials which are thrown in to absorb the liquids, thus saving a large portion of the labor which would otherwise be required in composting. It will be seen that from the tightness of the bottom of the cellar, nothing can be lost from it. The liquid and solid excrements of the cattle and horses, together with those from the swine, are here combined, and the quantity of strong manure thus made is 250 cords a year —a quantity which must soon produce a striking effect on the productions of the farm.

The live stock kept consists of four oxen, thirty cows, ten young cattle, seven horses, thirty breeding sows, and two boars. The milk of the cows is sold at South Dedham. An average of 250 pigs a year are sold before they reach the age of three months. The pens are so constructed that they are warm in winter. They have glass on one side to admit the sun's rays, and young pigs thrive well here, even in cold weather. The pigs bred are chiefly Suffolk boars with strong, well-made sows. Mr. C. is now using the noted boar "Sherman," imported by Mr. Stickney, of Watertown.

In 1861, Mr Clap commenced the reclamation of a tract of bog, comprising ten acres. It was then totally unproductive, and as unsightly a spot as could be imagined. Ditches have been cut round and through it, and already the change for the better is quite obvious. A portion of it—about three acres has been set to cultivated grasses, and produced this year from three to four tons of hay to the acre. Mr. C. has obtained such control over the water that there will be no difficulty in bringing the whole tract into a high state of productiveness.

Mr. Clap uses many labor-saving implements, among which may be mentioned the Buckeye mowing-machine, Bullard's hay-spreader, Palmer's horse-pitchfork, the wheel horse-rake, &c. He is well pleased with all these, but especially so with the hay-spreader and pitchfork. The former, he says, will save the labor of many men, besides drying the hay more rapidly than it can be done in any other way; and the latter is a great saving in the time required to unload hay, and a no less saving of human strength usually required in the operation. At a trial witnessed by some of the committee, a ton of hay was pitched off in six minutes. The force engaged was a man on the load who managed the fork, a horse which lifted the hay by a pulley, and a boy to lead the horse. Two men took away the hay as it was dropped from the fork.

Water is brought to Mr. C.'s buildings by a hydraulic ram, from a stream about eighty rods distant. All the water required for the stock, cooking for the swine, (and nearly all their food is cooked,) washing dairy utensils, &c., is thus supplied. The ram has been in operation for two years, and has not required a cent's worth of repairs. This is a convenient and cheap mode of conveying water, and might be more extensively used by our farmers with advantage.

It should be remarked that the cooking of the food for the swine is done by steam, and that the boiler by which the steam is produced, is placed in a building one hundred feet from the piggery, where the cooking is done. The steam is conveyed this distance by a pipe laid underground, and the food is cooked in large wooden vats. By this plan the danger arising from having fire near the barn is obviated.

A portion of the committee visited, unofficially, Rev. C. C. Sewall, of Medfield, the Corresponding Secretary of the society. Mr. Sewall's farm is mostly of rather light soil. It produces readily good crops of Indian corn and rye. Spring wheat has also been cultivated with general success for several years. On some portions of the farm, more moist than the rest, very heavy crops of hay are produced.

Mr. Sewall's stock consists mostly of cows, the milk from which is devoted to making butter. It will be recollected that the premiums offered for this article by our society, have many times gone to his dairy.

A point connected with Mr. Sewall's management of pastures, deserves mention. A field near the barn is set chiefly to red-top, and what is known as Kentucky blue-grass—*Poa Pratensis.* (The latter is one of several species, to which the term June-grass is applied in this section.) The grass grows very rapidly the fore part of the season, if the weather is moist, and unless the pasture is stocked to its utmost capacity, patches of grass will be left. The cattle will not feed down the grass thus left, unless impelled by severe hunger. Thus whatever grows here during the season is lost. Not only this, but the growth of succeeding seasons is generally rejected by the cattle, on account of its being mixed with the " old fog," which makes it unpalatable. Mr. Sewall mows these rejected spots of grass, which, well-cured, makes good hay. The after-growth, being fresh and sweet, the cattle keep it smoothly fed down. The hay costs nothing but the cutting and curing, while more feed is obtained than if the hay had not been cut.

Mr. A. B. Balch, on whom we called for a few minutes, showed us a handsome and productive apple orchard, and a neat and well-kept kitchen garden—the bountiful crops of vegetables attesting the advantages of the clean and perfect culture bestowed.

A call was also made at the farm of Joseph Bailey, of North Wrentham. It consists of 120 acres. It has for several years been quite noted for the production of apples. The orcharding covers forty acres. One orchard of seven acres produced in 1862, one thousand barrels of merchantable apples. Mr. B. sold the same year, 1,700 bushels of cider apples, delivered at East Medway, for ten cents a bushel, and made besides, 100 barrels of cider. Mr. B.'s cider is of superior quality, and readily sells at a good price. His orchards are kept in fine order—though but little manure is applied to them—and the profits are satisfactory. In one orchard, where the trees are large, sheep are pastured. They keep down the sprouts, keep the ground clear of all wild vegetation, and in Mr. B.'s opinion promote the productiveness of the trees. The ground is high, stony and moist. Some of that on which the oldest trees stand, was never ploughed, and could not be ploughed without first expending an immense amount of labor in removing boulders. Such situations seem well adapted to apple trees. A considerable portion of the ground where Mr. B. cuts his hay, was never ploughed from the same cause just mentioned, and yet it produces heavy crops of grass of good quality.

In August the committee visted the farm of A. A. Lawrence, of Brookline. This farm is situated in Newton, and contains 120 acres. It was purchased by Mr. L. in 1860, at which time it was much out of order, both as regards the condition of the soil, and the buildings and fences. Since Mr. L. took possession, various improvements have been made, and others are in progress. Handsome and substantial walls have been built along the highways, and for the principal division lines of the farm. The house has been remodelled, and rendered tasteful exteriorly and convenient internally. A store barn has been built, 100 feet long and 50 feet wide, with a deep cellar under the whole. The manure from the cattle and horses is deposited in the cellar, where muck and loam are frequently thrown over to absorb the urine.

A considerable portion of the farm lies on the sides of pretty high hills, and is naturally quite moist—too much so for the success of crops in general. Drains have been made here with very satisfactory results. A basin on another part of the farm, formerly a pond for a considerable portion of the year, has been drained the present season, and the ground promises to become valuable. Most of the soil of the farm is a strong, rather tenacious loam, and under the system of high manuring and thorough cultivation which Mr. L. practices, cannot fail to become very fertile and productive.

Mr. Lawrence keeps twenty cows, twelve of which, on the average, are in milk all the time. Nearly all the milk is used for making butter, the quantity of which, weekly, ranges from forty to seventy pounds. It is all sold to regular customers at fifty cents per pound, at which rate a better return is probably obtained for their milk than could be had in any other way. The dairy is managed with much care and scrupulous neatness, and the butter, as would be inferred from the price it brings, is of superior quality. The cows are generally fine. Some of the best are a cross of the Jersey, and a very fine bull of this breed, bred by the late J. P. Cushing, is now in use in this herd.

In September, some members of the committee, in company with several other gentlemen, visited the cranberry meadows of E. D. Miller, of Dorchester, the meadows being in Franklin. Dr. M. has about twenty-five acres set more or less to cranberry vines, part being of natural growth, and part having been planted. Of the latter, there are ten or twelve acres. The vines were chiefly planted in 1853, but did not reach their maximum production for several years. To obtain security against the crop being injured by the frost, one of the first steps taken was to form a reservoir for water, by which the plantation could be flooded in a short time. This has rendered the crop certain, there having been but one failure from frost, and that arose from neglect to let on the water during a cold night in spring. The water can be made to cover the vines in an hour and a half. The crop this year, on the cultivated plantation, was very large. Upwards of one hundred people were engaged in picking, at the time of our visit, and about three hundred bushels of fruit had been gathered. The best portion of the plantation yielded four hundred bushels to the acre. There seemed literally to be as many berries as the ground and the vines could possibly produce. They were large, dark-colored and heavy,—the quality being so superior that an extra price had been offered for them. We understand that the aggregate yield was 1,050 barrels, and that they sold at an average of $10 per barrel. We had no opportunity to obtain the particulars in regard to the cultivation of this cranberry plantation, but we hope that Dr. M. will, on a future occasion, furnish for the annals of the society, those interesting and important facts.

Of the farm of Walter H. Fisher, which, as previously stated, was this year entered for the premium offered for the best-cultivated farm, something has been said in former reports of the committee. It has long been known as a well-managed farm. The cardinal principles of Mr. F.'s management are evidently *order* and *neatness*, and there can be no doubt that agricultural operations conducted on this basis, produce the greatest results in proportion to the expense. This is strikingly exemplified by Mr. F.'s success. A prominent article in his farming creed is, that he "cannot afford to raise weeds." On this point his practice certainly corresponds with his faith. His farm, from one end to the other, including the road-sides as far as his land extends, is almost entirely free from everything that ought not to grow. The only exception to this, which we noticed, were some rushes and other aquatic plants on a tract of reclaimed swamp, where very large crops of hay have been obtained for several years. The wetness of this season and that of 1862, has probably aided in bringing in this wild vegetation. But we believe it might be entirely eradicated by more perfect drainage. The drains at present are open, and too shallow. If more were made, which would effectually cut off the soak from the surrounding and higher ground, and all were cut to the depth of two-and-half to three feet, and *covered*, the effect would probably be to render the hay produced on the tract of more value in the aggregate, on account of its improved quality, even though the quantity should not be increased. The covering of the drains would add an amount of productive soil to the lot corresponding to the space now occupied by the open ditches.

Mr. F.'s buildings are all attached together, and the different departments are generally convenient in reference to their respective purposes. It would be difficult to give such a description of them as would be understood, without diagrams.

Mr. F. takes much pains in regard to the saving of manure. It is kept in the barn-cellar in winter, mixed with loam. The soil of the farm is mostly of rather a light character. Sward-land is ploughed in August, or early in September, to the depth of about six inches. It is not cross-ploughed the following spring, the use of the Bucklin harrow bringing the inverted furrows into a good condition for Indian corn or potatoes, and at the same time mixing in with the soil such portion of the manure as is spread on the surface. In the fall of the next year, after the crops are off, the land is again ploughed, and in the succeeding spring is generally seeded to grass with barley.

The committee feel that, while they are not called upon to sanction every particular connected with Mr. Fisher's farm management, it has points of merit which amply justify them in awarding to him, as they do, the first premium offered by the society for the best-cultivated farm. His statement is herewith appended. SANFORD HOWARD, *Chairman.*

### *Statement of Walter H. Fisher.*

In giving you a description of my farm, I cannot, as is often the case in the advertisements of farms, represent it as being "divided into mowing, tillage, pasturing, and woodland;" but I can truthfully say, that it has all been mowed by me, woodland excepted. It has never been my purpose to beautify one part of my farm to the entire neglect of all the rest. But, it has been, and always will be my aim, to make it all produce something beside bushes, weeds, and briars. There should be no unsightly, unproductive acres, and need be none where all are properly cared for. I cannot afford to raise weeds in my cultivated fields, or a border of bushes beside my fences. I think the farmer's home should present some attractions to himself and to the traveller.

I will now give you an account of my labors and crops during the past year. On account of the scarcity and high price of labor, I did not deem it prudent to attempt more than I could accomplish with the aid of my son, a lad fifteen years old; consequently my cultivation of crops this year has been limited.

My farm at this time is occupied as follows:—Of Indian corn, 2 acres; potatoes, 7½ acres; barley 2 acres; English mowing, 10 acres; swamp and swale, 2½ acres; pasturing, 12 acres. The pasture which I have been reclaiming for the past two years, has been mowed this year—some of it twice. The balance of my farm is woodland.

The productions of my farm for the past season, stand as follows:—English hay, 22 tons, as near as I can estimate; 4 tons of the best swamp hay; 1½ tons of barley straw, and one ton of rye straw, also the fodder of two acres of corn. Of grain, 22 bushels of rye, 27 bushels barley. Of fruits, I generally have enough for my own use. In a few years shall probably have some for the market, as I intend to give more of my attention to that class of farm products.

My present stock consists of one yoke of oxen, one horse, four cows and one heifer, and I shall keep more when I get ready to occupy my reclaimed pastures. Since the middle of February I have fatted and sold two yoke of heavy cattle. Of swine, I have five.

I have paid out for labor, $66.44—most of it for haying. In the same time I have received for myself and team, $31.75, so that my expenses for labor, over and above that of myself and boy, amount to $34.67.

In regard to improvements, I have perfected some previously begun, and think I can say that my farm is gradually improveing.

Of my system of farming I need say but little, leaving it for the committee to judge whether it is judicious and safe to be followed. The care and management of my crops, I also leave for their inspection and decision. All that it would become me to say, is, I have endeavored that the cultivation should be thorough, and the crops kept clear from everything which might hinder their growth. The general plan of my buildings, I have no wish to improve; the committee have seen them, and can judge for themselves.

In September, 1861, my farm was divided into two equal parts, as near as practicable, my son taking one part, and I retaining the homestead. It reduced my hay crop about one-third, which is now nearly made good by the increase. The original farm contained about 170 acres, a large proportion being woodland. My present number of acres is 85. My conviction is, that the crops of any large farm may be doubled by a division. In June, when the committee examined my farm, my crops gave promise of large returns; but in consequence of two very severe rain storms, accompanied by high winds, my corn was twice prostrated almost level with the ground. This, occurring about the time of setting of the ears, greatly injured it. On three-quarters of an acre, the yield was 80 baskets, which would yield at least 40 bushels. On another small piece, containing 20 rods, the yield was 20 bushels of ears.

The oxen which I sold for beef, cost me as follows:—the first pair was bought in November, 1861, for $100. They were sold in February, 1863, for $165, doing in the interval all my work. The second pair was purchased in November, 1862, for $85, and sold in June, 1863, for $165. Of pork, I have slaughtered and sold one hog, having two more to kill, and three to keep through the winter.

Franklin, October 7, 1863.

## PLYMOUTH.

### *Report of the Committee.*

In 1859, the society offered three premiums for the most judiciously-managed farms, for a term of four years, the expenses and income to be reported annually. Only two farms were entered, one owned by Orlando Shaw, of Middleborough, the other, by Ephraim B. Thompson of Halifax. During two years Mr. Shaw conducted his farm with much energy, and accomplished very valuable improvements, but considering it his duty to enter the army, his farming was discontinued. By this change of plan, he, of course, forfeited all claim to either of the premiums, but in consideration of the industry with which he had labored, and the partial success he had attained, this committee felt it to be their duty to recommend a gratuity.

Mr. Thompson has persevered, through the full period of four years, in managing his farm according to the requisitions of the society, and in so doing, has met with very general and very satisfactory success. The committee, therefore, consider him entitled to the society's first premium.

It is to be regretted that there was not a larger number of farms entered for the offered premiums, so that there might be one, at least, of each class of farms in the county. The poor farmer, the owner of a small number of acres of unproductive land, is very apt to consider the success of his comparatively rich neighbor as beyond his reach, so that any statement of the means by which this success was accomplished, would, for him, have very little interest. The wealthy farmer, furnished with means to carry on his business in a large way, expects large results, and looks upon the labors of his poorer townsman as of too little importance to demand attention. The farm, the management of which has been reported to the society annually, for the last four years, is, fortunately, of average size, of average quality of soil, has an owner of average means, and, in all respects, is as good a representative of the farms of the county as could well be selected.

In making improvements, Mr. Thompson has always proceeded with very great prudence, and, as a consequence, is now able to look back upon his labor without regret. He has tried under-draining, but in a very economical way, and only where it was absolutely necessary; consequently, he finds that it pays. He has reclaimed some marsh, thereby adding an acre or more to his meadow, but the outlay, in doing this, has been the smallest possible; now he knows, with certainty, that he may reclaim more. He has made various experiments with manure, but only with such manure as his farm produced; so the dealer in fertilizers has not sent him any of those bills which it is so hard for a farmer to pay.

In determining the amount of stock for his farm, Mr. Thompson has endeavored to ascertain how much his farm could support, without any assistance from external sources. His cattle have, heretofore, consisted of native stock; but he is now so far advanced in the way of improvement that he has recently purchased two calves of the Jersey breed, one a heifer from the stock of the president of the society, and the other a bull, from the stock of Mr. Hobart of East Bridgewater. He has therefore commenced, advisedly, by mingling strains of blood which have not run together. The best team for him, he thinks, is a yoke of oxen and a horse. He buys young steers, works them until they attain maturity, and then sells them for beef. He keeps a small flock of sheep, which he believes to have been a great advantage to him in many ways, particularly in manuring, almost without cost, his exhausted upland pasture, which was so poor that it did not produce grass sufficient to cover its surface. Last season he broke up this pasture, and planted it to corn. At the same time, a field in a valley, naturally of rich soil, was planted to the same grain, both fields being well cultivated; but at harvest, the corn on the hill had cost fifty cents a bushel, that in the valley, one dollar; the difference in price was mostly due to the sheep.

The habit of keeping accurate accounts of expenses, which a farmer acquires in competing for the society's premiums, will be found to be of much more importance than any prize can be. The committee will venture to say that Mr. Thompson never knew the cost of any of the products of his farm before he began his annual reports to the society; or, if he did, he was a very rare exception to the almost universal law of ignorance on this subject, among the farmers of our county. Now he speaks with confidence of the cost of everything which he produces. When a farmer has this knowledge, he will be very careful to cultivate those crops only that pay, and leave the crops that do not pay, to others whose circumstances enable them to conduct such a business with more success.

There is no systematic division of labor in agricultural employment among us, and never can be, unless farmers learn what each can grow to the best advantage; and this can be accomplished only by keeping accounts. If a farmer has lived thirty years by his labor, and brought up a family, he knows, of course, in a rude way, that his labor has been profitable, and will guess that some crops have been more profitable than others; but the basis of figures and system is wanting to his judgment, which becomes, therefore, valueless. In those countries where agriculture has become a science, one farmer raises sheep, another fats them; one breeds cattle, another fits them for the butcher; one produces grain crops, another confines himself mostly to vegetables. It will be so with us when we understand our business better. The simple change of introducing accurate accounts into the management of our farms, would work a complete revolution in the agriculture of the county.

The committee do not mean to endorse fully Mr. Thompson's mode of keeping or rendering his accounts. There is no universal or uniform system of farm accounts known to farming in this country. We should like to say much upon this subject, if we had the time. The great difficulty with our farmers seems to be in making an erroneous estimate of the value of fodder used on the farm. If all the fodder is fed upon the farm, and turned to beef or stock, or to milk or butter, the *cost* of raising and harvesting and feeding it, like other expenses, might be charged to the beef, or to the dairy products, and the profit ascertained from the balance, including in that balance the increased value of the farm. He chooses to sell his hay in the form of milk, butter, or on the hoof, and the market value of the hay, or what he might have sold it for, is of no importance in ascertaining his actual profit, but only in ascertaining what his profit would have been had he sold it. But our farming is a mixed husbandry; we sell some fodder, some vegetables, and some stock, consume some, and feed out the remainder. For this reason it is perhaps best to value, credit, and charge all the manure made and expended, on the farm; to value, credit, and charge all fodder made and consumed on the farm, in the same manner as if the hay or manure were bought, or sold. But the farmer should be careful in his account of cost of keeping his stock, to charge it at the same value, as he credits it in the account of products of the farm. Mr. Thompson charges $120 as cost of keeping stock the last year, from November 15, 1862, to October 22, 1863. He credits the farm with 35 tons of English and fresh hay, $453, cut the last summer. In his account for 1862, printed in last year's report, we find that he credits the farm with 20 tons English hay $320, and 14 tons fresh hay $125, making five hundred and forty-five dollars' worth of hay. During that year, to November 15, 1862, he charges $150 for keeping cows and sheep, besides $30 for three tons of salt hay purchased. It does not appear that he has credited the farm in any year with any hay as specially sold, although this may have been the case. If such was not the case, he has either a very large supply of old hay on hand, or he has not charged the stock for hay at the rate at which he has credited it to the farm.

For the farmer who makes and spends his own hay and manure and has no question as to the crops he will cultivate, we know no necessity of including either in the farm accounts. His object is to ascertain his actual net profit up to the time he turns to cash his final product, in the form in which he intended to bring it to market. The cost to him is the interest on his money invested, and amount expended in labor, tools, taxes. seed, and repairs. The profit is all he receives over these expenses, and that profit is the excess over the interest on a fair market valuation of his farm, at the beginning of the year, added to its increased value by his cultivation during the year. But no good farmer should be satisfied with this mode of keeping his accounts, because it does not teach him whether he might not make a greater profit by selling his products in some other form. It may be better for him to sell the hay and buy manure. It may be better to graze cattle than to fatten them, or to raise market products, than to find his product at the milk-pail, or in the dairy. This he cannot do, unless he takes account of the cost and market value of his various crops.

But with a mixed husbandry, such as prevails in New England, it is especially necessary that he should keep an account of his manure and fodder, gathered and expended, as he cannot otherwise ascertain which crop or form of product is most profitable in proportion to the amount of manure and labor expended on it. If he puts all his manure in a corn-field, taking no account of it, he gets so many bushels of corn, but does he know that the same manure expended on another crop may not have produced a greater profit? Or that the abundance which he has devoted to one crop, may not have been at the expense of another? In this view it is material that the manure should be valued and accounted for. Valuable in itself, its disposition and judicious application become an element of value, if one crop suffers from its application to another. The large crop in one field which paid well, may, after all, have been costly, if obtained at the sacrifice of other crops in other fields; or the same amount of manure may have paid better in the same field with another crop.

These considerations leave him to the necessity of keeping an account with each field from year to year, by which practice the farmer will soon learn the most economical disposition of manure on his soils for the most profitable crop; he will, we doubt not, soon become satisfied that the highest manuring is the most economical; that it is better economy to plant less and manure more; and that it will be cheaper in many cases to buy manure, or not to break up at all, than to raise a thin crop.

We have made these remarks in no spirit of fault-finding. Mr. Thompson has kept an account during the last four years with each field, and no man knows better than he the actual cost of his crops. If his account does not clearly indicate the facts, or present us with such an inventory of results as we might have expected, it was not intentional. But we have taken the occasion to make these remarks for the benefit of others.

We do not propose to say any thing at present concerning the manner in which Mr. Roberts presents his farm account, except to suggest that whilst it presents an excellent summary or balance sheet, in a model form, it seems to us that it hardly presents the operations of the farm with sufficient detail; and to add that we do not endorse his credit of corn fodder at $15 per ton. CHARLES BURTON, *Chairman.*

*Statement of Ephraim B. Thompson of Halifax.*

I have had $2\frac{1}{2}$ acres of wheat the present year, $1\frac{1}{2}$ acres of which was summer wheat. I sowed 3 bushels April 17th, without soaking or any preparation, on light gravelly soil, which had been planted the two years previous to corn and turnips. From some cause not more than three-quarters of the seed came up. It looked very thrifty for awhile, but was injured by the drought in June, and the wet weather in July. On the 5th of August it was harvested, and turned out much better grain than I had expected.

One acre of winter wheat was sowed September 5, 1862. I find it more sure than spring wheat; it is less liable to injury from insects and the drought. I have sown another acre the present autumn on a sward ploughed soon after it was mown; spread and harrowed in 25 loads of manure from the barn cellar, (it being what had collected after June 1st;) I sowed 5 pecks of seed to the acre. It now looks very thrifty, the mild days of October having been favorable for it. In March I shall sow grass seed on the lot. We had $2\frac{1}{2}$ acres of oats which were very good for the past season.

The number of bushels of wheat and oats we are not able to give, as it has not been threshed for the want of water. Our threshing is done at my mill, where the grain is taken directly from the field.

Of the $2\frac{1}{2}$ acres of corn, one acre had been mown for five years previous to last year, when it was planted to corn; I ploughed in 20 loads of manure, with compost in the hill, and harvested 30 bushels at a cost of 90 cents per bushel. On this acre we had six cart-loads of pumpkins which are not taken into account. The corn was planted May 27th. It is an early variety which has been planted on the place for 27 years, but for several years past it has not produced so good a crop as formerly. I know not why a crop of corn would not be improved by change of seed, if it was not obtained from a distance, as well as oats or wheat.

The other lot of $1\frac{1}{2}$ acres of corn was an old field, which had not been ploughed for six years, during which time it had been used as a sheep pasture. I ploughed in 30 loads manure from the barn cellar, 7 inches deep, planted the Whitman corn, so called, but this seems to be an improvement on what that corn formerly was. The cob is much smaller, while the kernel is quite as large. The seed I had of Mr. Albert Thomas of Middleboro'. I planted in rows each way, $3\frac{1}{2}$ feet apart, on the 12th of May, using 6 barrels of poudrette on the lot, or about $\frac{1}{2}$ gill per hill. The corn was hoed twice, and harvested the last of September and the first of October; product, 150 bushels of ears. We laid aside 2 bushels, in an airy place, which has been shelled, and is now in good order to grind, which weighs 63 lbs., which would make a yield of 84 bushels of 56 lbs. from the lot. Charging one-half the manure ploughed in, and the whole cost of the poudrette and labor, the corn cost 50 cents per bushel. We believe the corn fodder will more than pay the expense of harvesting.

The following are the items of expense:—

| | |
|---|---|
| $\frac{1}{2}$ of 30 loads of manure ploughed in, . | $15 00 |
| " " carting out and spreading, . . | 3 25 |
| ploughing and furrowing, . . | 3 33 |
| $\frac{1}{2}$ bushel seed, . . . . | 62 |
| 6 bbls. of poudrette, . . . | 10 78 |
| 3 days planting, . . . . | 3 00 |
| 6 days hoeing, . . . . | 6 00 |
| | $41 98 |

*Potatoes*—$\frac{1}{2}$ acre of Davis' seedlings. Harvested 80 bushels, at a cost of 20 cents per bushel.

*Turnips*—200 bushels, at a cost of 6 cents per bushel.

My efforts have been to increase the crop of English hay, which for two years has been 20 tons annually. I shall have to put forth greater efforts to improve my pasture, or adopt the soiling system in part, as I can now winter twice the stock that I can pasture in the summer.

The lots drained continue to yield abundant crops. The one referred to in last year's statement, then having the item of $36.20 of expense outstanding for reclaiming, has the present year produced $2\frac{1}{2}$ tons of hay, together with the feed obtained from the lot since haying, and will more than balance the account of expense.

The crop of English hay was taken from 8 acres, and I have this year stocked down to grass 5 acres.

In farming I have endeavored to avoid all doubtful experiments, having in view a gradual improvement; which may seem a slow process, but in the end will bring a sure reward. In cultivated crops, corn for instance, we have in no case applied over 25 loads of manure to the acre, and that in some instances to the very poorest land we have. Whereas, if we had selected our best acres, and applied manure enough, we might have shown a greater number of bushels, and possibly arrive at what would be called a premium crop. But we have taken our acres in rotation as they needed breaking up, feeling assured that by proper rotation of crops, the land is, instead of being reduced from year to year, increasing in fertility. The appearance of certain lots (old fields) now, compared with former years, warrants this conclusion.

In the following items of expenses and products, wheat and oats are not included:—

| *Products.* | |
|---|---|
| 114 bush. corn, . | $114 00 |
| 103 " potatoes, | 51 50 |
| 200 " turnips, | 60 00 |
| 25 " carrots, | 8 00 |
| apples, . | 35 00 |
| 20 tons E. hay, . | 320 00 |
| 15 " F. hay, . | 133 00 |
| 170 lbs. cheese, . | 24 00 |
| 165 lbs. butter, . | 45 00 |
| Calves sold, . . | 20 00 |
| 9 pigs, . . . | 27 00 |
| Lambs sold, . . | 26 00 |
| Wool, " . . | 28 40 |
| 318 doz. eggs since Jan. 1, 1863, . | 49 77 |
| | $941 67 |
| | 710 24 |
| | $231 43 |

| *Expenses.* | |
|---|---|
| Interest on improved land and buildings, | $182 00 |
| Taxes on the above, | 36 00 |
| Labor, . . . | 175 00 |
| Manure, . . | 130 00 |
| Keeping cows & sheep one year, . . | 160 00 |
| Grass seed, . . | 10 24 |
| Keeping poultry, 24 hens, since Jan. 1, 1863, . . | 17 00 |
| | $710 24 |

HALIFAX, Oct. 22, 1863.

*Statement of Austin J. Roberts of Lakeville.*

In making my second annual statement, I would refer to the appended schedule of crops, which I have endeavored to make correct.* In these accounts there is no interest charged on the value of the land, neither do I make any charge for my own services.

The hired labor (two men) is charged, at cost, under the several heads. The board of laborers, and the employment of horses and cattle, under the head of "Team," are all estimated at cost.

Seeds, and other incidental expenses, are put under the head of "Cash." Manure is charged at two-thirds its value to the crops to which it is applied. The farm is divided into lots, and at the end of the season, a profit and loss account is made out and carried to its appropriate place.

As was fully stated in the first annual report, my intention, on becoming a farmer, was to make this farm a profitable one, and to prove conclusively that practical farming, which differs essentially from fancy husbandry, when united with fruit culture, will be found to pay well.

By raising field crops, alone, with *hired labor*, I soon found that the profit and loss account was pretty evenly balanced; too much so for the farm to support the farmer without his own unremitting exertions, and that much hired labor, rendered necessary on a large farm, must be dispensed with, or be supplied from profits derived from some other source than that of the farm. To this effect, I commenced in 1850 to plant trees. At that time there was no orchard on the place—a few scattered old trees produced at the most some 25 bushels—and have so continued slowly and progressively up to the present time. This year brings the first FULL crop from trees 13 years old, repaying the first cost of the trees and all the care and attention since they were set out.

Two-thirds of my apple trees are of the late Baldwin variety, a remarkably fine apple, which keeps better than the common kind.

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* The form of this schedule, will be found on page 120, of the Agriculture of Massachusetts, 1862.

From the thrift of the trees it is reasonable to expect in a few years a yield of at least 1,000 barrels of apples.

Orchards can be forced into much earlier fruiting than mine, but it is not good policy to stimulate trees into too rapid a growth by high manuring. They should have clean culture, and the soil kept in good heart. My young trees are extremely promising. They embrace only two or three varieties, selected as the best market sorts. These, with others previously set out, form orchards of about 700 trees.

My aim is now, not so much to raise many acres of corn, potatoes, and produce generally, as it is to give thorough cultivation to my fruit trees and the necessary care in guarding against the depredations of insects.

I would mention that among the improvements in progress, is the conversion of two and a half acres of swamp land into a cranberry meadow. The land is being pared in order for immediate sanding. My intention is to set out the vines in the spring.

HAY HALL, LAKEVILLE, Mass., December 1, 1863.

## MANURES.

### ESSEX.

### *First Statement of Benjamin P. Ware.*

I would respectfully submit the following statement of my first year's experiment as to the best mode of applying manure.

The piece of land selected for the purpose is nearly level, and of a uniform quality ; it is a dark loam, nine inches deep, resting upon a gravelly subsoil, is retentive of manure, neither heavy nor light, but fine and suitable for gardening, having been cultivated during six years for onions, and manured annually with good compost manure, seven cords per acre.

May 19th, I divided the land into five equal lots each measuring 40 by 200 feet. Upon lot No. 1 was spread evenly, at the rate of eight cords per acre, manure composted from meadow mud, sea and barn manure, in about equal parts, the whole completely saturated with night soil, all forked over, and well mixed twice before using; then ploughed the whole land eight inches deep; then spread an equal quantity of the same manure upon lot No. 2, and cross-ploughed the whole land four inches deep; then manured lot No. 3 in like manner, and harrowed the whole land thoroughly.

May 22d, marked out the rows 3½ by 3 feet, with a chain, and planted six kernels of common, eight-rowed yellow corn in a hill, one inch deep, eleven rows in each lot. Then spread upon lot No. 4 the same quantity of the same manure as on the other lots, and let it remain upon the surface.

Lot No. 5 had no manure. June 17th, worked the land both ways with a horse hoe, so closely to the corn as to require no use of the hand hoe. July 20th, cultivated both ways, and hoed the corn carefully. August 10th, went through and pulled up all weeds that had escaped the hoe. October 15th, cut up the corn close to the ground and stooked it.

Nov. 1st, harvested and weighed the crops on the several lots, resulting as follows:—

| | | | | |
|---|---|---|---|---|
| Lot | No. 1, | net weight of corn and stover, | 2,950 | pounds. |
| “ | “ | of sound corn in the ear, | 1,040 | “ |
| “ | “ | of unsound corn, | 39 | “ |
| “ | No. 2, | net weight of corn and stover, | 2,740 | “ |
| “ | “ | of sound corn in the ear, | 1,022 | “ |
| “ | “ | of unsound corn, | 36 | “ |
| “ | No. 3, | net weight of corn and stover, | 2,110 | “ |
| “ | “ | of sound corn in the ear, | 910 | “ |
| “ | “ | of unsound corn, | 27 | “ |
| “ | No. 4, | net weight of corn and stover, | 1,970 | “ |
| “ | “ | of sound corn in the ear, | 845 | “ |
| “ | “ | of unsound corn, | 29 | “ |
| “ | No. 5, | net weight of corn and stover, | 1,690 | “ |
| “ | “ | of sound corn in the ear, | 750 | “ |
| “ | “ | of unsound corn, | 23 | “ |

A bushel of the ears weighed 47½ pounds, and yielded 39½ pounds of shelled corn dry enough to grind, or 21 quarts of shelled corn, this kind of corn having a small cob.

A SYNOPSIS OF THE WEATHER AS AFFECTING THE CONDITION OF THE LAND DURING THE MONTHS OF

| | First Third. | Middle. | Last. |
|---|---|---|---|
| May, | moist. | dry. | moist. |
| June, | moist. | dry. | dry. |
| July, | very dry. | moist. | moist. |
| August, | moist. | moist. | moist. |
| September, | dry. | dry. | dry. |

MARBLEHEAD, December 23, 1861.

### *Second Statement of Benjamin P. Ware.*

In continuing the experiment commenced 1861, April 17th, 1862, I ploughed the whole of the land fine, and sowed one and a half bushels spring wheat, after soaking it two hours in strong brine; then harrowed it in and sowed one bushel red-top seed, twelve quarts herds-grass, and seven pounds clover seed, all mixed together; then brush-harrowed and dragged it, leaving the surface smooth and fine.

Aug. 12th, cradled and stooked the grain in the field.

Sept. 3d, weighed the unthreshed grain and stored in barn, threshed it immediately and allowed the grain to remain in chaff a week, then winnowed and weighed the clean wheat which resulted as follows:—

| | | | | |
|---|---|---|---|---|
| Lot No. 1, | produced | 745 lbs. unthreshed wheat, | 302 lbs. wheat, | 443 lbs. straw. |
| 2, | “ | 665 “ “ “ | 273 “ “ | 392 “ “ |
| 3, | “ | 685 “ “ “ | 268 “ “ | 417 “ “ |
| 4. | “ | 640 “ “ “ | 269 “ “ | 371 “ “ |
| 5, | “ | 670 “ “ “ | 246 “ “ | 424 “ “ |

For the sake of convenience in reference, I convert these products into rates per acre; which may be seen in the table annexed. Allowing sixty pounds of wheat per bushel—

| | | | |
|---|---|---|---|
| Lot No. 1, | produced at the rate of | 27 1-15 bush. wheat per acre, | 2,412 lbs. straw. |
| 2, | “ “ “ | 24⅔ “ “ “ “ | 2,134 “ “ |
| 3, | “ “ “ | 24 1-6 “ “ “ “ | 2,265 “ “ |
| 4, | “ “ “ | 24⅓ “ “ “ “ | 2,020 “ “ |
| 5, | “ “ “ | 22 1-6 “ “ “ “ | 2,308 “ “ |

It will be observed that the relative weight of straw is small, but it was cradled very high, and full one-third was left in the stubble.

SYNOPSIS OF THE WEATHER.

| | First Third. | Second Third. | Last Third. |
|---|---|---|---|
| May, | dry. | dry. | dry. |
| June, | moist. | dry. | moist. |
| July, | moist. | moist. | moist. |
| August, | moist. | moist. | moist. |
| September, | dry. | moist. | dry. |

MARBLEHEAD, November 14, 1862.

### *Third Statement of Benjamin P. Ware.*

The acre of land upon which was commenced the experiment on the application of manure in 1861, being in grass this year, was mown July 1st, and the hay from each lot was weighed July 3d, resulting as follows:—

| | | |
|---|---|---|
| Lot No. 1 produced | 805 | pounds. |
| " 2 " | 625 | " |
| " 3 " | 640 | " |
| " 4 " | 615 | " |
| " 5 " | 740 | " |

The severe drought in June affected the crop very injuriously which accounts for the small product.

SYNOPSIS OF THE WEATHER.

| | First Third. | Second Third. | Last Third. |
|---|---|---|---|
| May, | wet. | moist. | dry. |
| June, | dry. | moist. | dry. |
| July, | dry. | wet. | wet. |
| August, | wet. | moist. | moist. |
| September, | moist. | moist. | moist. |

MARBLEHEAD, November 14, 1863.

### *Continuation of Experiments on the Treadwell Farm, commenced in the years* 1861 *and* 1862.

The lot commenced on in 1861, (it being the third year) was in grass, which from some cause started quite poorly in the spring, and was also much affected by the drought in June.

| | | |
|---|---|---|
| Lot No. 1 yielded | 925 | pounds of hay. |
| " " 2 " | 747 | " " |
| " " 3 " | 408 | " " |
| " " 4 " | 370 | " " |
| " " 5 " | 30 | " " |
| | 2,480 | pounds of hay. |

### WEATHER REPORT FOR 1863.

| | First Third. | Second Third. | Last Third. |
|---|---|---|---|
| May, | .96 | .671 | .00 in. |
| June. | 1.232 | .178 | .44 " |
| July, | .629 | 11.288 | 3.76 " |
| August, | .676 | 1.131 | 3.16 " |
| September, | .01 | 1.21 | .77 " |

### LOT COMMENCED ON IN 1862.

Potatoes last year, barley the present. Land ploughed 6 inches deep.

April 23d, barley sown 5 bushels. Same quantities of grass seeds as last year.

Barley harvested first week in August:—

| | | | | | |
|---|---|---|---|---|---|
| Lot No. 1 | yielded | 7½ | bushels of barley, | and 735 | lbs. of straw. |
| " " 2 | " | 8½ | " " | " 735 | " " |
| " " 3 | " | 7 | " " | " 605 | " " |
| " " 4 | " | 7½ | " " | " 655 | " " |
| " " 5 | " | | 20 quarts " | " 110 | " " |

Barley, 31 bushels and 4 qts. 2,840 lbs. of straw.

### WORCESTER SOUTH.

#### *Statement of Dr. L. W. Curtis.*

The piece of land on which the experiments with manures entered by me for the society's premium were tried, contains about an acre, and was divided as directed into five plots. The manure was a mixture of yard and stable manure. Eighteen horse loads, of fifteen bushels each, (290 bushels,) were spread on plot No. 1, and the whole piece ploughed eight inches deep. The same quantity of manure was then spread on plot No. 2, and the whole piece ploughed four inches deep. The same quantity of manure was then spread on plot No. 3, and the whole piece was cultivated. The field was then furrowed both ways and planted, after which the same quantity of manure that had been put on each of the first three plots was spread on plot No. 4, plot No. 5 receiving no manure.

The soil is a loam with clay subsoil, moist and retentive—a part of it very wet until under-drained in 1859.

The weather was very dry up to the day the manure was spread on plot No. 4, (May 19th,) and from the following night to the day of harvesting, there was no time when it could be said to be dry, so that very little of the manure was lost. Had it been dry two weeks longer, much of the strength of that spread on the surface would have been lost by evaporation. Therefore this part of the experiment is not satisfactory, although through no fault of mine.

The field was planted with corn on the nineteenth day of May, 1860. As soon as the corn was well up it was cultivated both ways. The second week in June it was again cultivated, and hoed, and cultivated again the fourth week in June, and hoed the first week in July. Nothing more was done to it until the thirteenth of September, when the stalks were cut and haked up in the field, where they remained until the last of the month, when they were weighed and put in the barn, and the corn was harvested the second week in October.

It will be seen by the accompanying schedule that plot No. 3 gave the greatest weight of good corn, and the least poor; and No. 2 was next in order, while almost one-half of the product of No. 5 was not dry enough to put in bin, and was classed as poor corn, having moulded on the ear very much.

Plot No. 2 gave the largest amount of husks, and No. 4 the most stalks and the largest total product.

*Crop of* 1860.

| | Plot No. 1. lbs. | Plot No. 2. lbs. | Plot No. 3. lbs. | Plot No. 4. lbs. | Plot No. 5. lbs. |
|---|---|---|---|---|---|
| Good Corn, . . . . | 774 | 900 | 944 | 791 | 282 |
| Poor Corn, . . . . | 102 | 82 | 78 | 121 | 205 |
| Total of Corn, . . | 846 | 982 | 1,022 | 912 | 487 |
| Stalks, . . . . . | 480 | 484 | 506 | 540 | 256 |
| Husks, . . . . . | 675 | 781 | 693 | 735 | 449 |
| Total Product, . . | 2,001 | 2,247 | 2,221 | 2,187 | 1,192 |

Total product of the whole field, 9,848 pounds.

### SYNOPSIS OF THE WEATHER, 1860.

| | First Third. | Middle. | Last. |
|---|---|---|---|
| May, . . . . | dry. | dry. | wet. |
| June, . . . . | wet. | wet. | wet. |
| July, . . . . | wet. | moist. | moist. |
| August, . . . . | wet. | wet. | wet. |
| September, . . . | moist. | wet. | wet. |
| October, . . . . | wet. | harvested. | |

### *Crop of* 1861—*Barley.*

| | Plot No. 1. lbs. | Plot No. 2. lbs. | Plot No. 3. lbs. | Plot No. 4. lbs. | Plot No. 5. lbs. |
|---|---|---|---|---|---|
| Barley, . . . . | 344 | 410 | 498 | 510 | 210 |
| Straw, . . . . | 160 | 166 | 200 | 206 | 140 |
| Total Product, . . | 504 | 576 | 698 | 716 | 354 |

Total product of whole field, 2,848 pounds.

### *Crop of* 1862—*Hay.*

| | | | |
|---|---|---|---|
| Plot No. 1, . | 736 lbs., at the rate of | 3,680 | lbs. per acre. |
| " 2, . | 763 " " " | 3,840 | " " |
| " 3, . | 832 " " " | 4,160 | " " |
| " 4, . | 800 " " " | 4,000 | " " |
| " 5, . | 384 " " " | 1,920 | " " |

Weight of entire grain and hay crop for three years, on—

| | Pounds. | | Pounds. |
|---|---|---|---|
| Plot No. 1, . . . . | 3,241 | Plot No. 4, . . . . | 3,703 |
| Plot No. 2, . . . . | 3,586 | Plot No. 5, . . . . | 1,930 |
| Plot No. 3, . . . . | 3,751 | | |
| | | Total, . . . | 16,211 |

Hence we see that the plot on which the manure was cultivated in, yielded the largest product for the three years when the season in which the manure was applied was very wet, and no manure was applied except the first year of the series.

## PLYMOUTH.

### *Statement of Spencer Leonard, Jr.*

Having entered as a competitor for the premium offered for an experiment in the application of manure, commencing in 1861, and closing in 1863, I will give you the result of the experiment.

The weather, while the hay crop was in the field, was nearly as follows:—

| | First 10 Days. | Second 10 Days. | Last 10 Days. |
|---|---|---|---|
| May, . . . . | wet. | moist. | dry. |
| June, . . . | moist. | dry. | dry. |
| July, . . . | dry. | moist. | wet. |

The grass, on the plots manured, proved to be principally clover this year, and was well set. It was mowed June 25th, and again August 11th, and after being well cured, weighed as follows:—

Plot No. 1, 395 lbs. Plot No. 2, 420 lbs. Plot No. 3,384 lbs. Plot No. 4, 363 lbs. Plot No. 5, 102 lbs.

As you have had a statement of the mode of cultivation for the first two years, (see page 148, 2d part, Report of 1862,) I will now give you only the amount of the produce of each plot, with its estimated value for each of the three years. Corn is valued at $1 per cwt. on the ear, rye at $2 per cwt., hay at $16 per ton, corn fodder and straw at $8 per ton, in the following estimate:—

*Plot No.* 1.

| | | |
|---|---|---|
| 1861, 358 lbs. corn, . . . . | $3 58 | |
| " 274 lbs. stover, . . . . | 1 10 | —$4 68 |
| 1862, 107 lbs. rye, . . . . | 2 14 | |
| " 180 lbs. straw, . . . . | 72 | —$2 86 |
| 1863, 395 lbs. hay, . . . . | | 3 16 |
| Total value on Plot No. 1, for three years, | | $10 70 |

### *Plot No.* 2.

| | | | |
|---|---|---|---|
| 1861, | 343 lbs. corn, | $3 43 | |
| “ | 253 lbs. stover, | 1 01 | —$4 44 |
| 1862, | 90½ lbs. rye, | 1 81 | |
| “ | 145 lbs. straw, | 58 | —$2 39 |
| “ | 420 lbs. hay, | | 3 36 |
| Total value on Plot No. 2, for three years, | | | $10 19 |

### *Plot No.* 3.

| | | | |
|---|---|---|---|
| 1861, | 351 lbs. corn, | $3 51 | |
| “ | 249 lbs. stover, | 1 00 | —$4 51 |
| 1862, | 89 lbs. rye, | 1 78 | |
| “ | 140¾ lbs. straw, | 56 | —$2 34 |
| 1863, | 384 lbs. hay, | | 3 07 |
| Total value on Plot No. 3, for three years, | | | $9 92 |

### *Plot No.* 4.

| | | | |
|---|---|---|---|
| 1861, | 319 lbs. corn, | $3 19 | |
| “ | 230 lbs. stover, | 92 | —$4 11 |
| 1862, | 96½ lbs. rye, | 1 93 | |
| “ | 173¾ lbs. straw, | 69 | —$2 62 |
| 1863, | 363 lbs. hay, | | 2 90 |
| Total value on Plot No. 4, for three years, | | | $9 63 |

### *Plot No.* 5.

| | | | |
|---|---|---|---|
| 1861, | 255 lbs. corn, | $2 55 | |
| “ | 203 lbs. stover, | 81 | —$3 36 |
| 1862, | 63¾ lbs. rye, | 1 27 | |
| “ | 126 lbs. straw, | 50 | —$1 77 |
| 1863, | 102 lbs. hay, | | 82 |
| | | | $5 95 |

From the above it would appear that Plot No. 1, manure spread upon the top, and ploughed in, has made the largest return; but, as in my experiment which closed in 1862, Plot No. 2 (manure cross-ploughed in,) afforded the largest crops, I am inclined to believe that different soils and different seasons will show different results, and, if we get our manure evenly spread, it makes but little difference whether it is covered with soil one inch or six, but we should use every exertion to apply as large a quantity, and of as good a quality, as we possibly can.

## *Statement of Alonzo P. Benson.*

Having entered as a competitor for the premium offered for an experiment in the application of manure, commencing in 1861, I will now give you the result.

The weather, while the hay crop was growing, was as follows:

| | First ten days. | Second ten days. | Last ten days. |
|---|---|---|---|
| May, . . . . | moist. | dry. | dry. |
| June, . . . | moist. | dry. | dry. |
| July, . . . | dry. | wet. | wet. |
| August, . . . | wet. | moist. | moist. |
| September, . . | dry. | dry. | dry. |

The grass was a mixture of clover, bluegrass and timothy, and was cut the first day of July. When well cured it weighed as follows:—

| | | | | |
|---|---|---|---|---|
| Plot No. 1, | 1st crop, | 406 lbs. | 2d crop, 150 lbs. | Total, 556 lbs. |
| " 2, | " | 474 " | " 255 " | " 729 " |
| " 3, | " | 490 " | " 255 " | " 745 " |
| " 4, | " | 357 " | " 130 " | " 487 " |
| " 5, | " | 171 " | " 80 " | " 251 " |

I have given you the amount of the first and second crop separately, and as you have had a statement of the mode of cultivation for the two years past, I will now give you an account of the income of each plot for each of the three years.

### *Plot No.* 1.

| | | |
|---|---|---|
| 1861. | 1,244 lbs. corn, worth $12.44, 700 lbs. fodder, $2.80, 40 lbs. potatoes, 33 cents, Total, | $15 57 |
| 1862. | 163 lbs. oats, $3.26, 229 lbs. straw, $1.18, " | 4 44 |
| 1863. | 556 lbs. hay, . . . . . . . | 4 17 |
| | Total on Plot No. 1, for three years, . . | $24 18 |
| | The manure that was applied to the plot the first year, taken out of the income, . . . . . . | 10 00 |
| | Leaves, for labor and use of land, . . . . | $14 18 |

### *Plot No.* 2.

| | | |
|---|---|---|
| 1861. | 1,173 lbs. corn, $11.73, 689 lbs. fodder, $2.75, 40 lbs. potatoes, 33 cents, Total, | $14 81 |
| 1862. | 167 lbs. oats, $3.34, 230 lbs. straw, $1.15, “ | 4 49 |
| 1863. | 729 lbs. hay, | 5 47 |
| | Total on Plot No. 2, for three years, | $24 77 |
| | Taking out, for manure, | 10 00 |
| | Leaves, for three years' labor and use of land, | $14 77 |

### *Plot No.* 3.

| | | |
|---|---|---|
| 1861. | 1,171 lbs. corn, $11.71, 679 lbs. fodder, $2.71, 44 lbs. potatoes, 36 cents, Total, | $14 78 |
| 1862. | 168 lbs. oats, $3.36, 230 lbs. straw, $1.15, “ | 4 51 |
| 1863. | 745 lbs. hay, | 5 59 |
| | Total on Plot No. 3, for three years, | $24 88 |
| | Taking out, for manure, | 10 00 |
| | Leaves, for three years' labor and use of land, | $14 88 |

### *Plot No.* 4.

| | | |
|---|---|---|
| 1861. | 985 lbs. corn, $9.85, 446 lbs. fodder, $1.78, 32 lbs. potatoes, 28 cents, Total, | $11 91 |
| 1862. | 150 lbs. oats, $3, 228 lbs straw, $1.14, “ | 4 14 |
| 1863. | 487 lbs. hay, | 3 59 |
| | Total on Plot No. 4. for three years, | $19 64 |
| | Taking out, for manure, | 10 00 |
| | Leaves, for three years' labor and use of land, | $9 64 |

### *Plot No.* 5.

| | | |
|---|---|---|
| 1861. | 851 lbs. corn, $8.51, 426 lbs. fodder, $1.70, 32 lbs. potatoes, 28 cents, Total, | $10 49 |
| 1862. | 125 lbs. oats, $2.50, 220 lbs. straw, $1.10, “ | 3 60 |
| 1863, | 251 lbs. hay, | 1 88 |
| | Total on Plot No. 5, for three years, | $15 97 |
| | Taking out for manure, applied the year before the experiment began, | 5 00 |
| | Leaves for labor, and impoverishing the land, | $10 97 |

The result is, that No. 3, or the plot that had the manure harrowed in, is 11 cents ahead of No. 2, or plot that was ploughed four inches deep; 70 cents ahead of No. 1, where manure was ploughed eight inches deep; and 5 dollars 24 cents of Plot No. 4, where manure was left on top, exposed to sun and wind. No. 1 took the lead for the first year in corn, but No. 3 got the lead the second year, and has kept it.

The land, I thought, was all alike when I commenced the experiment, and still think that it was.

### *Statement of Spencer Leonard, Jr.*

Having entered as a competitor for the premium for an experiment in the application of manure, commencing in 1862, and ending in 1864, I will state the result of this year's operations.

You will recollect, from the statement of last year, that the corn was taken off and shocked, and the ground sowed to rye September 20th.

The rye came up well, and looked very even this spring, except Plot No. 5, where there was no manure, which was nearly all winter killed. It was cut and shocked about the middle of July, and taken in and threshed about the 12th of August, and weighed as follows:—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Plot No. 1, | . . . | 79 | lbs. of rye, and | 128 | lbs of straw. | | |
| " 2, | . . . | 86 | " " " | 140 | " " | | |
| " 3, | . . . | 86 | " " " | 134 | " " | | |
| " 4, | . . . | 61 | " " " | 100 | " " | | |
| " 5, | . . . | 8 | " " " | 15 | " " | | |

The weather, while the crop was growing, was nearly as follows:—

| | First ten days. | Second ten days. | Last ten days. |
|---|---|---|---|
| May, . . . . | wet. | moist. | dry. |
| June, . . . | moist. | dry. | dry. |
| July, . . . . | dry. | moist. | wet. |

# FRUITS.

## ESSEX.

### *Essay upon Open Air Grape Culture.—By John M. Ives.*

From the exhibitions of hardy grapes this year, we begin to have hopes that at no distant period the culture of this fruit will be an important branch of industry; but a few years since the Isabella was the only out-door grape, though only in the most favorable places could it be depended upon to ripen its fruit; but we now have varieties so much earlier, that this is being fast superseded by sorts not only sure of ripening in this latitude, but of superior size and quality, approaching the foreign kinds in delicacy and richness of flavor. Within a few years, we have had the Delaware, Concord, Hartford Prolific, Rebecca, Creveling, and other valuable kinds, all of which possess some qualities to recommend them as superior to the Isabella; the Rebecca, Delaware and Creveling, as being earlier, and of good quality, although a little tender and subject to mildew somewhat in foliage, while the Concord, and Hartford Prolific, are among the hardiest in this respect, yet the fruit is not quite equal to some, and has more of the harsh flavor, denominated "foxy," of the wild species. The Adirondac, Wilmington White and Cuyahoga, are new varieties which we have not as yet obtained.

The Allen Hybrid, raised by J. F. Allen, of Salem, we have never grown, and cannot speak with certainty as to its value as a *hardy* grape. We have seen specimens of the fruit, of fine quality resembling, to our taste, the White Sweetwater. Some of the cultivators around Boston think well of this variety; it is certainly a fine-flavored white grape. The Hartford Prolific, although valuable as one of the earliest, and about equal in quality to the Concord, has the fault of dropping its fruit, and the Concord which ripens two or three weeks later, fails to mature its crop in unfavorable seasons.

Of all the kinds that have come under our notice for the past four years, we have seen none to equal, taking into consideration all desirable qualities, the grapes known as Rogers' Hybrids, raised by E. S. Rogers, of Salem, Mass. His experiment in hybridizing has proved and set at rest a subject which has been some time in dispute among horticulturists and distinguished botanists; such among the latter is Le Conte, who says, "That although among some families of plants, hybrids occur naturally, or may be formed artificially, yet it is difficult to understand, how this ever can be the case in the genus Vitis, on account of the minuteness of the flower, and the parts of fructification; still we would not however assert that hybridization, naturally or artificially, is absolutely impossible." White, of Georgia, says "*it is the first time* that this has been done effectually." Mr. Rogers has given to the country, varieties of hardy grapes, the most valuable of any heretofore known for this latitude, and also for more southern ones, like New York and Virginia; some of his varieties, a little too late here, have been pronounced *there*, to be the best hardy grapes ever grown in those parts.

These varieties, some forty or more, were produced by hybridizing one of our best and earliest wild grapes, known as the "Mammoth," belonging to the species Vitis Labrusca, with two of the earliest of the foreign species (V. Vinifera) known as Black Hamburg, and White Chasselas, and the change from the wild type in the new seedlings is immense, and apparent to the commonest observer; the new varieties having none of the foxy odor, peculiar to the native parent from which the seed was taken, and resembling in size, color, and delicacy of fruit, the foreign, and the berries like this species having the property of not dropping. The few which were crossed with the Chasselas, have much of the character of this sort, not one of the seedlings coming black in color like those raised from fertilizing with the Hamburg.

Mr. R. has again crossed some of his present varieties with the foreign, a few of which have borne fruit; the fruit and foliage of these prove beyond the doubts of the most skeptical, the certainty of raising new grapes by this process. Another fact which we think is very strong evidence, is the character of the blossoms. It is well known to botanists, that all the American species of grapes are what is technically termed diœcious, polygamous; that is, that some vines are *staminate* and never bear, others have perfect blossoms and produce fruit.

If we attempt to raise seedlings from our wild grapes, about one-half or a large proportion usually prove barren, *never* producing any thing but blossoms; any one accustomed to examine these can tell when in flower, the fruiting from the staminate portion; these show large clusters of blossoms, but no fruit follows. With the foreign species, it is different; here the male or barren plant is not known; *all* the seedlings from these are fruit-bearing vines; and the fact that Mr. Rogers has never had an *un*fruitful plant among upwards of forty varieties which have borne, is strong evidence, without any other, of their being hybrids, inheriting this quality from the foreign parent. Thus from our wild grape, Mr. R., following the process of Knight of England with pears and cherries, has produced in a short time, varieties, which it might have taken a long course of years to get by the chance method of Van Mons, viz., beginning with the wild variety, and sowing the seed through successive generations, and whose best fruits after all, perhaps, were only accidental crosses, made by the bees, and from the pollen, floating in the air, from the many varieties which he had growing and blossoming together; by the latter process many thousand seedlings were raised to produce a few good fruits, while by the other method of hybridizing with a view to certain results, nearly all the seedlings prove superior, and very nearly, with the valuable properties we wish, as is the case with these grapes. Mr. R., knowing what was wanted, chose the wild variety on account of its hardiness and earliness (in preference to the Isabella,) for the mother of the new variety, and for the male parent, the two hardiest of the foreign species, viz., the Black Hamburg and the White Chasselas; and from these two species have come numerous valuable varieties, possessing many of the qualities desired, such as hardiness of vine, earliness and delicacy of fruit.

These grapes are sent out by numbers; No. 15 has ripened for four or five years in succession, when many other, much praised kinds, have failed; and this year especially, it has proved fine in many places, and superior to any kind that we know for its fine flavor. We have even heard many say that they preferred this to many of the foreign varieties from under glass, and this is not the only valuable kind among these new seedlings; there are many other varieties, which are thought nearly equal, and a few quite as good. Nos. 1, 3, 4, 9, 14, 28, 30, 33, 41, 43 and 44, and others which we have not as yet seen. The above-mentioned sorts are all earlier than the

Isabella, and many of them earlier, larger, and much superior to the Concord in quality. An intelligent Scotch gardener, who has had much experience in the culture of the grape, considers these hybrids to be the most promising grapes for outdoor culture we possess. This is also the opinion of one of the best judges and most scientific amateurs in the cultivation of the grape in New York State; he says "that No. 15, as ripened here at Ithaca, has to my taste a resemblance to the Catawba; it is decidedly of that flavor, but milder as a table grape, and about *twice* as large in size of berry as that variety. No. 4, as ripened here this year, is a fine large black grape of sweet and mild flavor, better than the best Isabella—this number reminds me of the Black Hamburg. As the New England varieties improve as to sweetness for two or three years after their removal here, I shall expect very much from these hybrids."

The same testimony has been given from Virginia, Ohio, Illinois and Canada. From this last place I received a paper containing an account of the recent "Fruit Growers' Convention," in Canada West. In their report on grapes exhibited, they say of Rogers' No. 15, "Not pulpy, *best* of the new grapes; berry and bunch large." Another cultivator in the same locality, says, "Rogers' No. 15 very hardy, early, fine flavor, large berry and fine bunch, well shouldered." J. B. Garber, of Pennsylvania, (who is said, in the "Germantown Telegraph," to have had more experience in fruiting these hybrids than any other person in the State,) says, "That he has fruited thirteen varieties of these new grapes this season, and that they are one and all superior to nine-tenths of the kinds in common cultivation, vigorous and fine growers, the wood ripening perfectly, and thus far with him, no mildew, rot, or any defect whatever; some were ripe the first week in September, and none ripened later than the Concord, and ALL were fully ripe before either the Isabella or Catawba."

The American grape is now receiving great attention in the vine-growing regions of Europe, especially France, where it is being introduced, *with the hope that it will be free from the disease which attacks and sometimes destroys the European vine*. The cultivation of the grape, particularly in Western New York, is considered a profitable crop. Mr. McKay has realized, during many successive years, from one thousand to twelve hundred dollars from the sale of grapes, grown on one acre of ground.

Soil, and Manuring the Vine.—The best and most natural soil for the grape is a dry, porous limestone. It should be well drained ; cold and wet situations are unfavorable for the vine. In manuring for the grape, we should *never* use animal manure *un*composted,—such was the testimony at the National Fruit Growers' Convention. The mineral manures, in consequence of their ingredients, have the most effect on the quality of the fruit, while animal matter encourages the formation of wood too fast, and makes the vine tender and subject to disease, and, we think, mildew.

The best dressing we find is bone and oyster shell flour, manufactured *without* burning. Bone dust contains the most nourishing elements, which, with wood-ashes, and a good surface soil, well covered in the fall with dry leaves, are nearly all the materials necessary for the vine ; the finer the dust of the bone, the more immediately active it becomes. Bones are said to contain a greater amount of phospheric acid than any other one substance ; hence it has been beautifully expressed that " there can be no civilization without population, no population without food, and no food without phosphoric.acid ; and that the march of civilization has followed the direction or supply of this material." Of all fruits none are more impatient of wet than the grape ; a dry situation is absolutely essential ; therefore, if the soil be at all retentive, thorough draining is necessary.

Grafting the Vine.—This is easily performed in the following manner : The soil, in the spring, is removed from the base of the stock below the surface. The vine is then sawed off and cut smoothly with a sharp knife. A cleft is then made in the top of the stock, two or three inches deep, and the scion inserted, containing two or three eyes. It is then covered with grafting wax, or clay, and the surrounding earth drawn up in a mound. The grafts which you intend to use in the spring should be cut from the vine in the fall previous, and buried either in the earth on a dry place, or put into sand in a cool and dry cellar. It is better, in the spring, to wait until the stock upon which you intend to set your grafts is in some state of forwardness, say nearly or quite in leaf, before you set the scions.

Layering.—This is the easiest and most successful mode of multiplying the grape-vine; it is simply to dig a trench near your vine, six inches wide, and three to four inches deep, and then take well ripened shoots growing near the base of the vine; bend these carefully and peg them down with the end of the shoot above ground. This must be done early in the spring. These will make good plants in one season for setting.

Pruning and Training.—It is difficult to give directions on paper for pruning vines, as there are so many cases requiring different management, but we will try to give a few general ones, that may be of benefit, and which if properly followed will produce finer fruit, and more regular crops, than if no pruning at all had been practiced. In the first place, we will suppose a young vine, one or two years old, about to be planted; it should be cut back, if not previously done (if it is in the spring) to two buds, only one of which should be allowed to grow through the summer; the other rubbed out after having pushed two or three inches, it having been kept in case of accident to the first. The growing shoot should be kept tied to the stake or trellis, and if the laterals are allowed to grow this season, they will do no harm, but rather increase the strength of the root. These laterals are side-shoots, springing from the base of the leaf on the same year's wood; and after the vine gets established, it is customary to keep them nipped back to one bud.

The vine has now arrived at the end of the first season's growth, and if it is strong and thrifty, having grown five or six feet, it should be cut back to three buds; but if it appears weakly, and has made little growth, it should be cut back to two, and treated the following summer the same as the first; it should now be covered for the winter. In the spring, (if it was a strong vine, when cut back the preceding fall,) two shoots should now be trained up, keeping the laterals before mentioned nipped into one bud; the other or third bud after having grown a few inches, should be rubbed out, as it was merely reserved in case of accident to either of the others. After the two shoots have grown their full length, and the leaves are off in the fall, they should be cut back, according to their strength, to four or six feet, each one being brought down horizontally within one foot or eighteen inches of the ground, and tied down to the trellis, or if intended to be protected in winter, this should be done the following spring.

When spring arrives, and the vines are uncovered, the two shoots should then be tied one each way, horizontally along the lower rail of the trellis; these are called the arms of the vine; upright shoots should be trained from them, beginning at the trunk or stem of the vine, and about nine inches distant each side; this will leave the upright or perpendicular shoots eighteen inches apart, which is near enough to allow plenty of light to the leaves, and prevent them from being crowded. The number of uprights to be taken this season will of course depend on the strength of the vine, but if possible the ones next the trunk or stem should be secured, and if the others push vigorously, train them up also, rubbing out the intermediate ones when nearer than eighteen inches; no fruit, or only a few berries, enough to test a new sort should be allowed to grow on them this year, as it will injure the fruitfulness of the vine for coming seasons.

At the fall pruning, these uprights should be cut back, the strongest to four or five feet, and the weak ones, to one or two buds, from which to lead new uprights; the shoot at the end of the arms can be pruned if strong, to four or five feet, as from this the vine is to be extended, and new uprights to be taken, till we arrive at the end of the space to be covered; after this the vine is protected for the winter. The following spring—the fourth from the setting of the vine,—it will be old enough to bear fruit from the upright canes; and this leads us to a question, whether the vine this summer will need any pruning, some thinking that summer pruning is injurious, and that the removal of the shoots or leaves, tends to spoil the flavor of the fruit.

This is right in theory, for if we take off the leaves of a vine or tree, or if they are destroyed by mildew, we know the fruit will be worthless; but notwithstanding, we would recommend judicious summer pruning as absolutely necessary where we have not space for the vine to grow naturally; as for instance, over some large tree, where it has plenty of room to extend itself, and get the full benefit of sun and air; and we think those who advocate letting a vine grow in summer without pruning, on a small trellis which is intended to be well filled with fruit from top to bottom, would find in practice, that their theory, although correct, could not be well followed with profit; and therefore we recommend summer pruning properly performed, as being a very important part of the art of cultivating the grape with success; and this now carries us back to our vine, which has been regularly pruned every year in the fall, but has now arrived to the state, when it is about to need summer pruning. The uprights, if strong, will now begin to push shoots from the buds along their side, each of these shoots will probably have from one to four bunches of fruit, but we should not allow more than two upon the stronger and but one on the more feeble shoots to remain, or if we take off from every other, or alternate shoot, the vine will be the better for it.

As the season advances, we shall now notice that the shoots near the top of the uprights push much stronger than those below, and should be pinched off, leaving two or three leaves beyond the bunch of fruit, or blossom. Those at the lower part can be left to grow a few weeks longer, thereby gaining strength; after this they can be cut back to a few leaves—say three beyond the fruit. Now, if the vine had been allowed to take its natural course, we begin to see the difficulty;—two or three of the upper buds, on the uprights, would have taken the whole strength of the vine from the lower ones, and grown perhaps ten or twenty feet, and which we should have been obliged again to cut off; but by the other mode, the sap was equalized over the whole vine, each shoot getting its fair supply, and the lower ones consequently stronger, and with better and larger foliage to feed its fruit, than if the vine had taken its natural course. The pruning of large established vines should be done soon after the fall of the leaf, previous to laying them down. By pruning at this period (say November,) the sap collected by the roots stimulates the buds, which will cause them to push earlier in the following spring—a matter of importance where the summers are short.

The only course to pursue with old vines that have been neglected, is to choose branches containing the best and ripest wood, cutting back all side shoots to one or two buds, and leaving three or four feet, more or less, of the new wood upon the end of the branch; these branches, after being shortened and trimmed, must now be laid along the trellis, eighteen or twenty inches apart. If there are more branches than is necessary, they must be cut away.

Mildew.—The oidium of the vine is supposed to be a variety of mildew which generally attacks the under surface of the leaf, and is presumed to follow after rains or a continuance of cold, damp days, especially if these conditions follow a period of dry, hot weather. The fact that grape-vines growing in sheltered positions, and the occasional occurrence of vines growing upon trees, retaining their health, while branches near by will be mildewed, seems to show that the foliage of the tree protects them, and is some evidence that the cause is atmospheric. We are inclined to think that shelter, a well-drained soil, and the avoiding of strong animal manure, will do much to prevent this evil.

## WORCESTER NORTH.

### *From the Report of the Committee.*

Pears.—We are much of the opinion that farmers should more generally engage in the business of pear-raising. When we reflect how few people ever have the pleasure to regale themselves upon the best varieties of this delicious fruit, owing to the high prices at which it is sold, we can readily see that the production of this crop can be very largely increased, with no danger of breaking down the market. For an increased supply will be followed by such an increased demand, as to prevent the price from falling below that point that shall be fairly remunerative. With an acre, or half an acre, devoted to pears, the farmer would find ample time to attend to the requirements of his little orchard, without encroaching upon his other crops. And with the requisite knowledge which every intelligent man can now so easily obtain, he would make pretty sure a generous return for the outlay. And then, the intellectual effort of reading himself up on this subject, the knowledge he might obtain of the laws of vegetable growth and development—which knowledge is so richly interspersed through the writings of all those who treat on pear culture,—would become a valuable accession to one's mental store-house, and serve to incite to a wider thought, and a habit of closer observation.

But it will be essential, in the first place, that he should make the selection for his orchard, from those varieties that are the most hardy and productive, and will be eagerly sought for in the market. The location and soil should be favorable, and the ground stirred and enriched from time to time, as the necessities of the trees may require. All stimulation to a late growth of wood that will not properly ripen before the season closes, should be avoided, and any tendency to such growth should be immediately checked, as it is very liable to ultimate in the frozen-sap blight, a disease fatal to the pear tree.

For good practical information on this whole subject, we would recommend Mr. Field's excellent work on pear culture.

But should any one enter upon this business, without the requisite knowledge for success, and with no love for his new vocation, and so mismanage his trees, or leave them in utter neglect to struggle alone with the weeds and the grass, he will probably encounter the same failure that he would by dealing with any other crop with the same measure of ignorance and neglect.

The presentation of pears for the table at our annual fair this year was very good, though not perhaps any better than in some preceding years. We missed the usual contributions of Hon. Moses Wood and Benjamin Snow, Jr. The number of contributors seemed to indicate the fact, that not a few of those who have a garden and a homestead, are becoming somewhat interested in the subject of pears. We trust that their example will be more generally followed by those who possess larger means for the production of this noble fruit.

Grapes.—We are glad to perceive, by the number and character of the contributions offered for premiums in this department, that the interest in the cultivation of this fruit has, year by year, gradually increased.

The two varieties that seemed to take the lead for their superior qualities and perfection, were the Concord and Delaware. The Concord appears to be more generally cultivated, while the Delaware seems to have been but recently introduced into this vicinity, and its adaptedness to this locality, therefore, is not as yet fully tested. But the plate of Delawares presented by Mr. Emory, was certainly ripened to the greatest perfection, and was invested with a sweetness and deliciousness that "melted with multiform flavor on the palate." From the few specimens we have seen, we confess a favorable leaning towards this variety, but a general cultivation will of course better test its various qualities.

Our cold and variable New England climate is considered very unfavorable to the proper culture of the grape. And it certainly is a serious obstacle to the perfect ripening of our best American varieties, while the foreign grape can be perfected only under glass. Stern old winter, with his unwelcome lingerings, chilling, as he does, with his cold breath, the breezes of May; and the early frosts of September, which betoken his returning footsteps, make up for us a year of which well two-thirds are given over to the partial or complete reign of the winter king. Such a climate is indeed unfavorable not only to the highest perfection of the grape, but to general vegetation also; for many of our staple crops oftentimes suffer in consequence.

A climate and soil like ours cannot, of course, present the best conditions for that high state of farming that will yield great crops with little labor, and no painstaking. Such is not the privilege of New England agriculture. But her peculiar privilege is this: that these obstacles of coldness of climate and sterility of soil, but furnish the occasion for the development of the true New England glory, in the characteristics of her people—industry, skill, genius, perseverance, ingenuity in overcoming all natural impediments, powers of contrivance, and skilfully conducted experiments, ultimating in invention and discovery. These constitute the depths of New England's resources. Do the frosts ruin the corn crop? New England enterprise does not succumb under the blow, but plants a kind of earlier growth and ripening—for corn the farmer will have. Does the grass winter kill? or does the drouth cut it short? The farmer does not give up the hay crop. He still labors on for success, and studies for protection from adverse causes. And so it is, that New England stands to-day foremost in that skill and science that constitutes a successful agriculture. And we are sure that when the energy, perseverance and skill of our people are once enlisted in grape culture, all obstacles to success will in due time be mastered, and our markets be filled with the delicious clusters.

It strikes us that an addition to the few already existing varieties of real excellence, well suited to this climate, would be desirable. When this small number is compared with those of the pear and the apple, it certainly is a meagre show. Now we see no reason why, with the same labor and pains that has been bestowed on other fruits, for this purpose, an equal success may not be attained, and we think that the results would be more speedily obtained, than in fruits of a slower growth and bearing.

The history of the development of the pear, reveals to us the inexhaustible resources of nature, to evolve and multiply varieties, and to increase their excellence. And we doubt not, that these skilful and mysterious forces, in their latent and hidden capacities, are richly laden with the germs of numberless varieties of the grape, which for excellence and fitness for our climate, may surpass any as yet known.

When we consider that the grape is indigenous to this country, growing everywhere, on river-side, and on hillside, climbing over and along old stone walls, and on high forest trees, flourishing in exuberance without care and cultivation, we cannot withstand the conviction that Providence designed that the grape should become an article of agricultural production. And we cannot but believe, that under the skilful, developing hand of man, guided by a true knowledge of the laws of grape culture, this fruit may, by the same ameliorating process, follow the history of the pear, and from the wild state of one or two kinds, expand into numberless varieties of superior excellence, and suited to the necessities of our climate.

In the matter of the care and management of the grape vine, we have taken the liberty to cull the following few extracts from a paper prepared by R. H. Phelps of Connecticut, entitled, "Cultivation of Grapes in New England," and published in "Patent Office Report for 1858, Department of Agriculture." We deem them of far more worth than any thing we could offer from our own experience and observation.

Soil and its Preparation.—"As a general rule, we prefer a porous soil, moist in a degree, but not retentive of moisture —a warm, friable loam, which can be readily pulverized, and is not liable to become hard baked by the sun. A soil abounding in disintegrated rocks, reddish gravel, or brown protoxide of iron, appears to be especially adapted to grapes. Nearly all of our American varieties will thrive upon land on which a good crop of Indian corn can be raised; and upon the mountains and stony hillside where grain or grass would make but stinted growth. They will feed and produce where other vegetation would starve. This is believed to be true all over the world. In some parts of Europe the vine is grown on ledges so steep that the laborers can only with difficulty stand at their work. With us, a subsoil, porous and permeable, is absolutely requisite, that the roots may penetrate, which they will do to a great depth if no obstruction prevents. A stiff, retentive substratum can be ameliorated by deep and thorough drainage with tiles, so that air can be admitted and the surplus water pass off. It is well under any condition to break the earth to the depth of eighteen inches in any ground where the grape is planted. It is not claimed that poor, sterile land is to be preferred, but a proportion of sand, gravel and stones underlying deeply the surface soil, is generally suitable for this product. Between soil and location, I consider the former of the most importance. If a vine has sufficient depth in any good earth, it will ordinarily thrive in any good locality. There is, however, something to choose in situation as regards exposure, and a south-eastern declivity is usually recommended. A hilltop or gently undulating surface is better than a level or deep valley. Upon hill summits or elevated ground, the temperature is more mild and uniform than in the valleys beneath, and consequently such locations are better adapted to the grape."

MANURING.—"Like other plants deriving their best nourishment from a return of the chemical constituents which have been extracted from the soil, contained in their own decaying vegetation, the leaves and prunings of the vine are congenial elements for its growth. Bones, old leather, refuse plaster, turf compost, soap suds, &c., constitute good manure. Bones appear to be the best of all substances to promote its permanent vigor. In digging up a grape-vine, near which some bones had been buried, I was surprised to see with what avidity the roots sought after them; every bone was literally covered with a network of fibrous rootlets, and every cavity so filled with them, that it was impossible to disengage the bones without tearing the rootlets to pieces. A dressing of wood ashes each year, is a benefit, by supplying the loss of alkalies which are largely consumed by the grape. Whatever element of fertility is applied, it should never be done when the grapes are approaching their full size, nor early in the fall; because the result will be a larger growth of canes, which not being sufficiently matured to withstand the winter and spring frosts, would hazard the life of the vine.

Mulching the ground with light manure, muck, or especially with vine leaves, makes an absorbent for the heat during the day, which is in part radiated at night, causing a more equal temperature, and during the hot drouth of summer, holds in absorption the rains and dew, thus screening the earth from two extremes, heat and drouth, lessening the danger from autumn frosts, and promoting a full development and maturity of fruit."

Pruning and Training.—"As to the right time for pruning vines in New England, we have mostly come to the conclusion that early winter is the best, say in the month of November, soon after the falling of the leaves.

"Respecting the best method of pruning vines, opinion is undergoing a decided change. The practice in Europe of very close pruning has been followed in this country by foreign vine dressers, without duly considering the difference of climate and the character of our vines. Ours are indigenous, while the vines of Europe were originally brought from Asia, some two thousand years ago, and have been dwarfed by excessive pruning, so that they will bear the loss of nearly all their tops with comparative impunity, and submit to be planted in hills about as thick as our Indian corn. But at last they show the certain effects of long ill usage, in the fatal *oidium* or blight.

"As some portions of a vine naturally die out of themselves each winter, would it not be well to follow the hints of nature in *our* practice? As a general rule that system of pruning is best which shortens or thins out a moderate portion of each season's growth, allowing a gradual and uniform increase, and with a view to check the tendency of the vines to bear fruit exclusively on the extreme ends of the branches. But no one system of pruning is adapted to every condition, for something depends on the age of the vine, the variety, and the space allotted to its growth. It is to be remembered that the fruit always grows on young or new shoots, which start from the wood of the preceding year. This principle will serve as a general guide in pruning the vine under all circumstances; and any one by a little practice can perform the work. Some varieties of moderate growth are pruned and trained according to what is called the *renewal system*, upon stakes. The mode of training which is gaining favor with us is that upon wires. This method is suited in a remarkable degree to the vine, as its nature is to ramble far over hedges, trees and fences, and to clasp its tendrils tenaciously around every twig and shrub within its reach. By trellising upon wire, no tying up is necessary which saves much labor; for the tendrils, their natural and best support, eagerly take hold of the strands of wire, and have a chance to indulge their rambling and climbing propensities. Wall trellising is gaining favor wherever practiced, and can be done with much economy. A few feet of waste or unoccupied ground about a barn, outhouse, shed, or near the walls of a dwelling, afford a most congenial spot for grape-vines, and they are easily trained so as to cover a large area on the side or roof of a building."

We trust that ere long this New England character will overcome all obstacles of climate and the lack of desired varieties; and so make our own section of the country abound in this excellent fruit, bringing it, in its perfected state, within the reach of all. E. F. BAILEY, *Chairman.*

## HAMPSHIRE, FRANKLIN AND HAMPDEN.

### *From the Report of the Committee.*

The introduction of any new variety of good fruit, whether by bringing from abroad, or propagating at home, should receive special encouragement from the society.

Your committee believe the time is near at hand when the orchard will be considered the most valuable part of the farm. New England can hardly expect in grain-raising to compete successfully with the rich soil of the western prairies; but most of its land, and even a large part of that which is given up to poor pasturage and flourishing alders, might be converted into smiling and thrifty orchards. Many of the failures and discouragements in fruit-raising arise from ill-advised and poor culture. Different varieties of fruit require each its particular soil and aspect, in order to do well; and *all* must have good culture. How few orchards have annually the labor and fertilization which are given to corn and tobacco. Until we are willing to bestow such culture on our fruit trees, we must expect beggarly returns in crops. Thousands who never expect good crops of corn without thorough tillage, pronounce fruit-raising unprofitable, because their trees do not yield great crops with little or no cultivation; acting in this matter as though they thought their orchards must produce grapes from thorns and figs from thistles!

The cultivation of the smaller fruits demands greater attention. Against this does not lie the objection so often raised against planting orchards; that too much time is required before we can enjoy the fruit. A judicious selection of strawberries, currants, raspberries, gooseberries, blackberries and grapes, all of which can be raised with comparatively little labor, would, in connection with the orchard, supply the cultivator with a constant succession of fruits profitable for the market, and healthful and delicious as food for the table. No fruits make better returns for the outlay required to raise them, than grapes, such as are adapted to our climate. The Northern Muscadine, Concord, and Delaware, flourish and ripen well in the open air of this valley. Every home would be happier which had these vines growing on its grounds, beautifying its surroundings, and bending with heavy clusters of luscious fruit to delight the palate and promote the health and comfort of every member of the household.

In conclusion, your committee would urge the owners of land to devote a large portion to fruit, believing that with the same cultivation which is given to the cereals, it will pay well; if not in wealth, certainly in health and happiness, which are the true ends of wealth. SETH HUNT, *Chairman.*

## PLYMOUTH.

### *From the Report of the Committee.*

The entries of fruit this season were not so numerous as usual. Heretofore, the show of fruit at our exhibitions has been quite creditable to the county; but, owing to causes not very certainly known to the committee, the diminution of interest in the matter has been quite remarkable. It has been intimated that the amount of premiums offered was not sufficient, if gained, to pay the expenses of getting fruit ready for exhibition, which will appear considerable, if we call to mind the labor of collecting, transportation, the damage done to the fully ripe specimens, and loss from gathering fruit before it is ripe. This excuse, if offered by a poor man who does not make fruit-growing his business, might be considered good; but a man of wealth would, of course, hesitate, before offering such an apology, if it occurred to him that he might so easily aid a good cause and gratify a large class of his fellow-citizens. One would suppose that the professed fruit-grower would not need to be urged to bring forward his fruit for exhibition, as it is the cheapest advertisement of his business, whether he gets a premium or not.

Of all the fruit grown in the county, apples are, unquestionably, of most importance; their healthfulness, their many uses, their keeping qualities, their cheapness, make them indispensable to the comforts of every family. The demand for this fruit is constantly on the increase, and the planting of orchards seems to keep pace with the growing demand. All over the county, young orchards may be seen, in the most thrifty condition. The management of apple trees is so simple, that almost all farmers cultivate more or less successfully, if they make the effort. It is true, the best kinds are not always grown, nor the old practice of seeding the orchard to grass wholly discarded, but that there is a very general improvement in the care of trees is very observable. Too many of the very old orchards, damaged by neglect past all recovery, the fruit of which was good enough in its day, but now deteriorated, remain to tantalize their owners with the expectations of fruit which will never be realized. The best way would be, to let them totally perish, and to plant vigorous young trees, which, with care, will soon come into bearing.

It is a well settled fact that the apple tree will grow and thrive on any soil, except a wet one, if one condition be complied with; and that is, that the land shall receive annual cultivation. Of course, to obtain large crops of the best fruit, a good soil is necessary; but no one should be deterred from planting apple trees, because his soil is poor; he will succeed with thorough cultivation, if the manure applied be but small in amount.

The art of pruning the apple tree is by no means a difficult one. Begin with the tree when young; cut out all the branches which seem damaging or useless; practice this annually, and when the tree is fully grown, it will, in most cases, be what it ought to be.

The common method of keeping apples is, to put them into barrels as soon as gathered, and leave them in the orchard, under the shade of trees, till quite severe frost, when they are removed to the cellar. Many persons think that apples cannot be kept well, if the barrels are placed in the confined air of a barn, instead of being allowed to remain in the open air of the orchard, in the warmer part of autumn. But Mr. Austin J. Roberts of Lakeville, who has observed and experimented much in keeping apples, does not follow the common method. All the fruit is carefully picked from the tree and removed to some building, spread on the floor in piles not exceeding one foot in depth, and there suffered to remain and "sweat" for two or three weeks, when it is picked over and placed in barrels, not to be disturbed again till sold. His crop of apples, this season, amounted to three hundred barrels, and all were treated in this manner.

As there is some difference in tastes, there will be a corresponding difference in judgments as to the best kinds for general cultivation. Those who cultivate for their own use only, will want a variety, even if some are poor bearers. Those who grow fruit for the market will, perhaps, confine themselves to half a dozen kinds, all of which must be good bearers, producing large and fair fruit.

Mr. Thomas O. Jackson of Plymouth, who has had much experience in fruit culture, has been kind enough to furnish the following list of apples, for general cultivation, which have ripened well and proved of good quality with him. His soil is a heavy clay, which has been under-drained, enriched and cultivated in the most thorough manner:—

Sweet Bough, Red Astrachan, William's Favorite, Holden Sweet, Gravenstein, Manomet Sweet, Porter, Golden Sweet, Hubbardston, Golden Russet, Loring Sweet, Holmes, Baldwin, R. I. Greening, Tolman Sweet, Ladies' Sweet.

The pear is one of the most delicious of fruits and the most difficult to cultivate. Many have engaged in the culture with high expectations; a few have succeeded, most have failed; some have obtained great profits; others have met with serious losses. It seems to be foreign in its nature, and it has not yet been fully subjected to our soil and climate. Among the hundreds of varieties, there is scarcely one which, in some seasons, though planted in the most favorable soil, is not worthless. In some seasons a pear may be large, in others, small; in some, it may crack, in others it may be insipid; and all this under the very best of care. The trees, too, are subject to disease. What some call "sun blight," and others, "winter blight," is fatal to a large number; and, generally, they are the best trees in the orchard. In July or August, when the trees may be filled with fruit half grown, this disease often makes its appearance by turning all the leaves black, in two or three days, shrivelling the fruit and the bark of the smaller branches. Soon, the bark on the trunk will be found loose, particularly near the ground, and next year, the roots will be rotten. As the blight seldom or never attacks a stunted tree, but one that is rendered tender by vigorous growth, the common theory, that the sap is too much heated in summer, or frozen in winter, is probably the true one. Sometimes it happens that the disease does not prove fatal; in which case, only part of the bark near the ground will become loose, owing, it may be, to the death of one or more of the large roots. Such are some of the difficulties with which the grower of pears will probably meet, and if he be an inexperienced one, they will be likely to be overwhelming. If he plants a tree in a very sheltered place in his back yard, where the sink drain terminates, he may calculate on success; if he plants a hundred, in an exposed place in his orchard, in nine cases out of ten, seven-eighths of them will probably be worthless.

The experience of a member of this committee in pear culture is perhaps, that of many others. In 1850, he made up his mind to plant five hundred pear trees, expecting, in his inexperience, to realize some of the glowing descriptions which he had read in the books. They were purchased without judgment, planted without skill, cultivated for two or three years without care. He then became aware that an improvement in cultivation was necessary, since which time, the trees have not suffered, for want of food or a well loosened and clean soil. After a few years more, he discovered that many of the varieties which he had, however they might thrive in other soils, were not adapted to his; so grafting was commenced. Now, after thirteen years of impatient expectation, he is not able to say that the trees which were planted solely for profit, have paid the interest of their first cost, though the fruit has sold for three dollars and upwards per bushel; yet he still lives in the most confident expectation that his pear orchard will yet become a success in the good time coming.

There have been remarkable instances of success in pear culture, doubtless, particularly in the neighborhood of Boston and other large cities; but this success has been obtained by men skilled in the business, favorably situated as to a market which they thoroughly understood. There are many pears grown in the town of Plymouth, and the soil or climate is remarkably favorable to their perfection, yet it is highly probable that there are few persons who have orchards that have as yet been profitable.

As the selection of the best varieties is quite a difficult matter, it is very desirable to know the opinions of experienced fruit growers. Three gentlemen of Plymouth, having extensive pear orchards, and long experience in growing a great variety of fruit, have kindly furnished lists of the pears which succeed best on their soils. The three soils resemble each other very much, being strong loams. Mr. Thomas O. Jackson has a very large pear orchard, which is about fifteen years old. The trees are very vigorous, and have made remarkable growth. Mr. Jackson makes the following list:—

Early—Bloodgood, Dearborn's Seedling, Rostiezer.

Autumn—Bartlett, Golden Beurré, St. Ghislain, Belle Lucrative, Louise Bonne de Jersey, Seckel, Duchesse d'Angouleme, Merriam, Eyewood, Bosc, Buffum.

Winter—Glout Morceau, Lawrence, Vicar.

Mr. B. M. Watson, who has the finest young pear orchard in the county, and has a long experience in the cultivation of other fruits, recommends the following as the best varieties of pears for general cultivation:—

Early—Doyenné d'Eté, Giffard, Rostiezer.

Autumn—Bartlett, St. Ghislain, Belle Lucrative, Flemish Beauty, Sheldon, Bonne de Jersey, Swan's Orange, Superfin, Bosc, Urbaniste, Seckel, Fulton, Duchesse d'Angouleme, Clairgeau, Diel, Figue, d'Anjou.

Winter—Glout Morceau, Lawrence, Winter Nelis, Easter Beurré.

Mr. Gustavus Gilbert cultivates about half an acre of land stocked with shrubs, flowers, ornamental trees, apple and pear trees, grapes, currants, gooseberries, raspberries, with enough space left for his dwelling-house, green-house, and kitchen garden ; the very best half acre known to this committee. Mr. Gilbert makes the following list of pears for general cultivation :—

Early—Giffard, Dearborn's Seedling, Tyson, Rostiezer.

Autumn—Bartlett, St. Ghislain, Golden Beurré, Belle Lucrative, Louise Bonne de Jersey, Sheldon, Swan's Orange, Seckel, Urbaniste, Beurré d'Anjou, Beurré Superfin, Paradise d'Automne, Figue, Duchesse d'Angouleme, Boussock, Doyenné du Comice.

Winter—Glout Morceau, Winter Nelis, Passe Colmar, Vicar, Lawrence.

Peaches.—The show of peaches this year was smaller, perhaps, than at any previous exhibition. Less and less attention seems to be given to the cultivation of this delicious fruit, on account of the difficulty, it is to be presumed, of preventing disease in the tree. There are some localities, however, in our county, where the peach seems to thrive. Mr. Austin J. Roberts of Lakeville has met with so much success in its cultivation that he has recently added to his peach orchard five hundred more trees. Mr. Roberts cultivates the best grafted varieties, but in other parts of the county where the grafted peach fails, remunerating crops are obtained from seedlings, especially when planted in sandy soils, and elevated situations.

Grapes.—The show of grapes, both foreign and native, was very creditable. A small but very choice and well grown collection was offered for exhibition by Mr. John Higgins of Rochester, which was, unfortunately, too late for competition.

Cranberries.—The cultivation of the cranberry is becoming, every year, of more importance. The demand increases quite as rapidly as the supply, so that the high prices are maintained, and the profits derived from the culture, in some towns, amount to a considerable income, estimated the present year, in one of the towns on the Cape, at more than twenty-five thousand dollars. Nine lots of cranberries were offered for premiums, and owing to the uniform excellence of the fruit, the committee found it exceedingly difficult to decide to which the prizes ought to be assigned. Places favorable for the culture of this fruit are to be seen throughout the county, and it is to be hoped that the owners will be awake to their interests, and commence the culture without delay.

CHARLES BURTON, *Chairman.*

### *Statement of Ephraim Stetson on Cranberries.*

My cranberry meadow, which now measures one acre and sixty-three rods, was formerly a cedar swamp, the surface being but a few inches above the level of an adjoining pond. I think it is now too wet, although I have raised the surface somewhat; but I cannot drain it as the ditches are always nearly full of water. I began to clear the swamp in 1857, and to set vines in 1859, and I have set from twenty to sixty rods per year since. I have removed the trees, stumps, and bushes, and, in some places, the turf and moss, and covered with gravel from five to sixteen inches deep, as was requisite to secure a uniform level. The vines of the first year's setting were lifted from the ground, by the ice, during the first winter, and they have grown but little since. The others have done well, but they are not yet old enough to be very productive. The fruit now on the vines, though not abundant, looks finely. I think there will be from ten to fifteen bushels. I have kept the land entirely free from grass and weeds, having devoted most of my time for the last five years to preparing the land and cultivating the vines. I think I have spent nearly a thousand days' work in this way.

HALIFAX, September 15, 1863.

### *Statement of Henry M. Allen.*

I had, near my dwelling in the town of Marion, a small piece of very thick, rocky swamp, which I felt anxious to subdue and bring under cultivation. I finally decided to clear it off and plant cranberries. I cleared it entirely of rocks, trees and turf, then levelled it, and ditched it, and covered it with white swamp sand from two and one-half to four inches thick, and planted half of it in the month of September. In the spring following I found one-half of my vines dead, which I replanted in May, and also the remaining half in May and June of 1861. The vines I planted last are now far in advance of those planted in the fall of 1860. I have never flowed it, but let all the water that falls upon it pass off as soon as possible. I have under cultivation one acre and fifty-four rods, which has cost me $700. I have harvested the present fall nineteen bushels of fine large cranberries.

Marion, October 13, 1863.

### *Statement of Saunders Walker.*

When I first began to cultivate the cranberry I found vines growing among the brushwood, and I thought if the turf was removed and vines set out they might grow. I went to work draining and removing the turf, in which I expended about $125. This was in 1841. Not being acquainted with the business I took the advice of the agricultural newspapers, and spread on sand at various thicknesses, setting my vines in rows eighteen inches apart. But the sand brought in rushes, grass and moss, so I quitted it till 1850, when I thought I would try a piece without sand. I accordingly cleared a piece and set the vines in the peat, and the third year I had about two bushels of splendid cranberries, and the fourth year I had five bushels. Since then I have done all my limited means would allow. I find by experience that setting vines in the clear peat, without sand, is the best way. I think I have more than an acre under way, on some parts of which there is very handsome fruit. I have got the swamp all drained, which has cost about $250, and I intend to keep on setting as fast as I can. The present year's crop is considerably injured by frost and worms, espepecially on the old vines and hills. On the new vines and runners the injury is much less. From one square rod, where least injured, I took one and three-fourths bushels, and some small spots of new vines will yield more. I find that new and short vines yield the best and earliest fruit.

Pembroke, September, 25, 1863.

### *From the Report of the Supervisor.*

The cultivation of cranberries has not, heretofore, proved invariably remunerative. From some investments of this nature enormous profits have been realized; from others but an unsatisfactory harvest of "great expectations." In some cases, where meadow has been prepared at considerable expense, the vines, without apparent cause, have failed to grow, or growing, failed to bear fruit. In others the cranberry worm has devoured the product, leaving the proprietor but "a beggarly account of empty husks." In still others the crop has been destroyed by frost, which, whether occurring in the late spring or early autumn, is alike damaging to the hopes of the cultivator. The first-named evil, will, doubtless, be of less frequent occurrence in the future, when the peculiarities of the plant and the nature of the soil to which it is adapted become more fully understood. For the others there is no known remedy of general application. The burning of turf on the border of meadows has been recommended as a preventative of frost. Though very pretty in theory, the recommendation is of little practical value. An unlimited command of water is the only certain means of protection against frost, and the most plausible one against worms. In Barnstable County and in portions of Plymouth and Bristol Counties the temperature is so modified by currents of air from the ocean that the danger from frost is very slight.

But like other extra-hazardous business, the cultivation of cranberries has attractions for such as are able to run considerable risks for the chance of large profits; and it is doubtless destined to increase till this fruit becomes a very important item in the agricultural products of Massachusetts.

Your supervisor has been at pains to visit cranberry meadows in different parts of the county, as well those which are not, as those which are, entered for premium. A few notes on the best methods of cultivation, the result of his experience and observation, and of his intercourse with cultivators, may be of interest to those who are intending to enter upon this branch of *berry-culture.*

A most important consideration, in selecting a cranberry meadow, is its location. This should be, if possible, below the surface level of a natural or artificial pond or reservoir, from which the ditches may be filled and the vines covered in an hour, if necessary, and at the same time, so far elevated above some place of discharge that the water may be quickly withdrawn. In such a location the vines can be readily protected from frost, which often gives scarcely an hour's notice of its approach; and this, too, without the danger of scalding which arises when water is suffered to remain about the vines through the bright sunshine which sometimes follows a September frost. In such a location the whole surface can be flowed in winter to such a depth as to secure the roots from injury through the heaving of the soil; and the flowing can be continued at such a height, and to such a time in the spring as future experience and research may determine to be effectual for the destruction of the cranberry worm. And in such a location the vines may be easily supplied with moisture, if necessary, while the fruit is maturing. The latter consideration is not of great importance, for such a necessity very seldom occurs.

Cranberry meadows, both natural and cultivated, are far oftener too wet than too dry. This is always the case where, on digging, water is found within eighteen inches of the surface. Hence, where there is but a choice of advantages, an opportunity for thorough drainage is preferable to facilities for flowing. The testimony of experts is universally to the point that vines are more vigorous on slight elevations of surface, and on the banks of ditches, where the drainage is most perfect, than elsewhere. Through the meadows of Mr. Stetson, one of the competitors, is a dike or causeway, composed of turf and moss, covered with gravel, and used as a pathway to and from the upland. The vines which have rooted upon the aprons of this dike are, beyond all question, of more vigorous growth, and were, when visited, more finely fruited than the adjacent vines at the general level of the meadow. Very successful experiments in cranberry culture have been made on land which is never flowed, but which is dry enough for the plough at almost any season of the year.

Because peat, which supplies the natural aliment of the cranberry plant, and in which it grows spontaneously, is usually saturated with water, it is sometimes inferred that this is a sort of semi-aquatic plant which will thrive only where water greatly abounds. This is a mistake. Cranberries can be successfully grown in any soil, however elevated, in which mould, from woody or vegetable fibre, is a considerable ingredient; and in a suitable soil the danger of injury from drought is not greater than in the case of other cultivated plants. From this fact grew the error, now exploded, that the cultivation of cranberries was practicable on any upland, whatever the nature of the soil.

Cranberry meadows are prepared by removing the turf to such a depth that neither grass nor bushes will start from the roots, and setting the vines either in the pure peat, or in a surface covering of sand or gravel. The former method is preferred by some, for the reason that the grasses, which will take root in the peat, after cultivation becomes impracticable, are much less formidable enemies to the vines, than the rushes and other wiry plants that invariably gain a foothold in sanded or gravelled meadows. Sand and gravel check, rather than promote, the growth of the vines. They are useful only as they facilitate the process of clean cultivation while the vines are acquiring complete possession. Some cultivators, who have applied sand, have subsequently removed it and reset their vines. Others, who have covered deeply with gravel to secure a uniform grade, have found it necessary to place a shovelful of peat or moss beneath each hill when transplanting. This is the case with the meadow of Mr. Stetson, on which the gravel is evidently too deep to allow of a vigorous growth of vines without some application of this kind. If sand or gravel is used, it should not exceed two or three inches in depth, that the roots, not only of the original vines, but of the runners, may readily reach the peat, from which, alone, they can derive their proper sustenance.

For transplanting, vines should be selected whose fruit is of good size and of dark color when ripe. The egg-shaped berries are usually the largest and consequently the most saleable, though not as heavy as some of the smaller varieties. The vines should be separated from all grass and other roots, and bound in bunches of half a dozen or more, by twisting about them one of the longer runners, and in this condition they can be set very rapidly, in hills, from fifteen to eighteen inches apart; or they may be scattered singly in drills, or, where clean culture is not proposed, they may be sown broadcast and covered slightly with the hoe. Vines may be set at any season, but the spring is to be preferred, as vines set early become more firmly rooted and better able to withstand the winter than those set later.

After the vines are set, it should be the aim of the cultivator, as soon as may be, to put them in exclusive possession of the soil. To this end all moss, grass and weeds should be kept down, with the hoe, while hoeing is practicable, and afterwards by hand, till the supremacy of the vines is fully established, which, under favorable conditions, will be effected in about four years, when cultivation is usually discontinued.

The spreading of the vines may be greatly promoted by the use of concentrated fertilizers, care being used to select such as are free from the seeds of plants which might germinate and prove troublesome. In this particular, guano is, perhaps, preferable to any other manure. A very small quantity, even half a teaspoonful, of this substance, scattered upon the vines in each hill, will have a marked effect in increasing the vigor of their growth. After the vines have completely covered the ground little remains to be done except to use all available means for protecting and securing their fruit. Where vines cannot be readily covered with water, the time of harvesting must be determined by a choice of evils; either an early harvest of immature fruit, or the risk of partial or total loss that attends a later one. Perfectly ripe fruit keeps best and sells best; but fruit not fully ripe is sometimes deemed better than none at all; and the cultivator will, in this respect, be governed by the liability to frost of his particular locality, and his own necessities, preferences and judgment.

ALDEN S. BRADFORD, *Supervisor.*

# GRAIN CROPS.

## WORCESTER SOUTH.

### *Statement of Dr. Samuel Hartwell.*

INDIAN CORN.—The crop of Indian corn which I offer for premium, grew upon two acres of land. Two-thirds of the lot was in grass and mowed for the five previous years. This part of the lot, before seeding with grass seven years ago, was thoroughly sub-soiled, ploughed, and freed from all stones that were of sufficient size to obstruct the plough. This portion of the lot also was ploughed in September, (the fall previous to the planting,) about eight inches deep, the furrows were then smoothed over with a harrow, afterwards there were spread over the surface, from the cart, forty loads (thirteen cords) of stable manure to the acre, which was ploughed in four inches with a horse and plough.

The manure had lain one year in large heaps and had so far ripened, oxydized, or undergone a slow combustion, by absorbing oxygen from the atmosphere, that its color was almost black, yet not sufficiently decomposed to render it pulverizable. A further exposure to the atmosphere was necessary, before much of it would be sufficiently rotten to become soluble in water, which condition must be obtained before it could enter the circulation of the plants, and thereby stimulate their productiveness. This object was obtained by the manure laying near the surface of the ground during the winter. The labor of preparing the ground in the spring for planting, was but small. It was only to lighten the soil with the horse and plough, and furrow the same, and it was ready to plant.

The other third of the two acres was in corn last year. The same quantity of manure was used in proportion upon this part of the field, as upon the other. The corn upon the first part was much larger than that grown upon the other. The whole of the two acres was planted on the 19th and 20th of May, in hills three and a half feet apart each way, five kernels in a hill, making 3,555 hills on an acre.

I was particular that all the kernels should be dropped as near together as possible, for the accomplishment of which I had a tin tube made, which was about three feet long, three inches in diameter at the top and tapering to three-fourths of an inch at the bottom, with a foot bulb to prevent it from entering and sticking to the soil. The upper end is connected with a dish, with a handle upon the side similar to a tin wash-dish, for holding the corn to be dropped through the tube. Any tin worker can make one of them, the cost of which should not exceed one dollar.

Botanists speak of plants that are solitary, and of others that grow in families. Indian corn is a family plant. I have never observed a stray stalk of corn, from the hill, to bear a large ear. In hoeing corn, when the stalks are in close proximity, most of the work can be done with the hoe, whereas if the shoots are scattered the fingers must be used to destroy the weeds. When the stalks are combined, they resist the wind much better than when they stand at a distance from each other. The corn also comes up better. In covering corn there is frequently found a lump of earth or a small stone over the blade, which one blade alone is not able to throw off, but combine five of the same power and this obstacle will be tipped over. There is an advantage too in harvesting, as it comes more directly in reach of the hand and corn-cutter. In rowing the corn both ways, the cultivator can be run within six inches of the hill, leaving only one square foot to be cultivated by the hoe. In this way I have had one man hoe one acre in a day at weeding time.

The ordinary expenses of working an acre of corn, three times hoeing, is $15.00 up to the time of the last hoeing; after that time the fodder will pay all other expenses of taking care of the crop. This $15.00 is exclusive of manure and the application of the same.

Forty loads of manure, with the labor of spreading the same upon the land, cannot cost less than $60.00, one-third of which ($20.00) should be charged to the corn, the remainder should be charged to the five years' subsequent crops, at the end of which time the land should again come under the plough.

The land at this time will be found in much better condition than it was at the beginning of the previous six years. This will more than pay the loss of interest on the manure.

My corn was cut up and stooked about the 15th of September; it was husked about the middle of October. The whole weight of the corn in the ear was 12,920 pounds, making, at 75 pounds for the bushel in the ear, 172 bushels on two acres, or 86 bushels to the acre. One acre might have been selected which would have given a larger proportional amount.

For my "seed corn" I am indebted to my friend Moses Stebbins, Esq., of South Deerfield. The account of profit and loss will stand thus:—

| | |
|---|---|
| Expenses of cultivating one acre of corn, | $15 00 |
| *Contingencies*—Seed corn, scarecrows, powder and shot, strychnine and arsenic for poisoning squirrels, and time connected therewith, | 5 00 |
| Expenses of manure and applying the same, | 20 00 |
| | $40 00 |
| Eighty-six bushels corn from one acre, at $1.00 per bushel, | 86 00 |
| Profit per acre, | $46 00 |

SOUTHBRIDGE, Nov. 5th, 1863.

## HAMPSHIRE, FRANKLIN, AND HAMPDEN.

### *From the Report of the Committee on Grain and Seed.*

We would observe, in the first place, that there should be a proper adaptation of soil to the crop. Some soils do not possess that natural fitness to mature certain crops of grain. Others have become exhausted by cultivation, and do not contain any thing to make a crop of, and therefore cannot yield one of any value for reproduction.

Some plants will mature their seed to a greater degree of perfection if removed to a different soil from that which produced them. For instance, very fine cabbages are produced upon heavy and perhaps wet soil; but as a general rule they will mature better seed if transplanted the second year in a dry soil. To how large a class of vegetables this general rule will apply, careful experiments alone must decide. Some kinds of grain are liable to blast on certain soils on account of an improper application of fertilizers.

This leads us to notice, in the second place, the importance of a judicious application of fertilizers in all their various forms. A liberal application of fresh made, or concentrated manures may, in some soils, produce grain of a superior quality, but the experience of your committee has taught them to prefer manures well composted, and thoroughly incorporated with the soil, for the production of grain and seeds.

Third. Thorough culture also promotes the growth of plants. It tends to eradicate noxious weeds, which draw their nourishment from the soil, some of which are liable to mix and form with the cultivated crops, a worthless hybrid, and in other ways prove detrimental to the growing crop. It prevents blasts and vegetable diseases, to some extent.

Thorough culture has a tendency to destroy and in other ways prevent the ravages of insects and vermin, which sometimes nearly destroy the crop.

Fourth. Some skill and judgment should be exercised in selecting seeds for reproduction, as well as the time and manner of sowing the same. Grain is not unfrequently found of unquestionable vitality, and true to its kind, that was produced under circumstances which render it unfit to use for seed.

The reproductive quality of seeds is sometimes improved by age, to what extent is a debatable question. It is generally admitted that squash, pumpkin, and melon seeds are of that class.

Tobacco seed, which has been kept for a long time, was found to be very prolific, but rather deficient in foliage. The same fact has been noticed in connection with some kinds of grain which had been laid aside, and forgotton for a long time, and afterwards used for seed.

Samples of grain have come to us in connection with ancient relics, which have proved quite productive and worth preserving.

In view of facts like these, it might not appear strange if your committee should indulge a hope that through the influence of some antiquarian society there may yet be exhumed from the sunny side of Eden (perhaps not far removed from the tree of knowledge), a package of seeds which possess all their native purity and original vitality. When this shall come to pass, we trust they will be placed in the hands of some live Yankee, who will make them useful.

The condition of the soil, the state of the weather, and the proper time for maturing seed, must regulate the time of sowing. If sown in such a manner as to admit of after culture, the quality of seed produced is very much improved. For instance, oats, with ordinary culture, rarely produce more than twenty-five fold; if sown in drills, properly thinned and cultivated, they not unfrequently produce a thousand fold, and what sensible man would not prefer seed for reproduction known to have been produced by such culture. A constant care is required to prevent a mixture of plants of different varieties.

But rather than weary your patience we will cut the matter short, by urging a strict adherence to scientific principles in the culture of seeds. When samples of those seeds are presented for exhibition, let them be accompanied by carefully prepared statements concerning the application of those principles, and we feel confident that beneficial results will follow.

LEVI P. WARNER, *Chairman.*

## NANTUCKET.

### *Statement of Edward Hammond.*

INDIAN CORN.—Having entered as a competitor for the best experiment in raising Indian corn, I will say that the land on which it grew was sandy loam; it had been in grass about twenty years, without manure, producing about three-fourths of a ton of hay annually. Last May I ploughed it six inches deep, and applied twenty-five loads of compost manure, of fifteen bushels each, and harrowed it twice, which, from long experience I believe to be much better than to plough the manure under. On the 27th of May I planted with native corn, in hills, three feet one way by four feet the other, which was a mistake, as I have no doubt there would have been much more corn had it been planted three feet each way, as I intended to have had it. It was cultivated twice and hoed twice. I cut the stalks about the 15th of September, harvested November 12th, and the result was fifty-five bushels of shelled corn per acre.

VALUE OF CROP.

| | |
|---|---|
| 55 bushels corn, at $1.20, | $66 00 |
| 1 ton stalks, | 10 00 |
| | $76 00 |

EXPENSE OF CULTIVATION.

| | |
|---|---|
| Ploughing, | $3 00 |
| Twenty-five loads manure, | 12 50 |
| Harrowing, | 1 50 |
| Cultivating and hoeing, | 4 00 |
| Planting, | 2 00 |

| | | |
|---|---|---|
| Value of seed, | $0 50 | |
| Harvesting, | 3 00 | |
| Interest on land, | 1 50 | |
| | | $28 00 |
| Net profit, | | $48 00 |

The corn cost thirty-two cents seven mills per bushel; now if we subtract one-half the expense of the manure, as is the practice of many that contend for the premiums, it would have cost but twenty-one cents three mills per bushel. My object in this experiment is to prove that the largest crops are not always the most profitable.

# ROOT CROPS.

## ESSEX.

### *From the Report of the Committee.*

The attention bestowed upon the cultivation of root crops and vegetables in the county during the last season, has been somewhat modified by the difficulty experienced in obtaining that kind of labor which is adapted to them. Our farmers have long since abandoned all doubts with regard to their profit, and the benefit which they confer upon the animals fed upon them. During the last few years they have been very generally introduced into every section of the county; not perhaps so largely as we could have wished, but extensively enough to indicate an increasing appreciation of their value. The onion crop of Essex County has become one of the well-known proofs of the profit of judicious and skilful cultivation. The carrot crop has become in some regions one of the staple products of the farm and a very considerable article of merchandise among us. Our dairymen have learned the value of the mangel wurzel. And all who find it necessary to winter store cattle on rather inferior fodder, have become satisfied that the turnip crop can do more than anything else to increase the nutritive qualities of hard fare.

We doubt whether any man among us who has learned these facts by experience, could be made to believe that twenty-five tons of carrots on an acre of land, or twenty tons of ruta-bagas are not a profitable crop ; because, as is said, nearly ninety parts in one hundred are water, in a free and innutritious condition. It is evident that however great may be the dilution, there are floating in this liquid, and diffused throughout it, and combined with it, certain chemical agents which, presented in this form, are peculiarly adapted to the production of animal fibre. The argument so frequently used, that root crops, particularly turnips, contain a large percentage of water, and must therefore be deficient in nutritive power, will apply to almost every article of food known to man and animals. Every product of the soil contains a certain quantity of matter, either woody fibre or water, which of itself is not nutritious ; but which under proper combinations is highly useful and important.

It should be remembered that by actual experiments in feeding, 300 pounds of Swedish turnips are proved to be equivalent to 100 pounds of English hay ; and that under this rule, an acre of land which produces two tons of hay, will, by furnishing eighteen tons of turnips, increase its production of food three-fold. These crops are a fair average for the estimate. It is found moreover that 1,728 grains in weight of Swedish turnip afford 110 grains of nutritive matter ; and that 3,000 grains of white clover contain only 100 grains of nutritive matter. According to this estimate turnips are nearly twice as nutritious as undried white clover ; and it would require a crop of thirty-six tons of green clover to the acre to afford the nourishment furnished by eighteen tons of turnips. Clover contains by actual test five-sixths of its weight in water ; and we need, therefore, only twelve tons of the green clover to furnish us with the two tons of dry hay which we have introduced into our calculation.

We present these comparative estimates to show that, weight by weight, the turnip crop is superior to the grass crop in point of nourishment, taking each crop in a green state ; and that the loss in water is much less in the former than in the latter.

But beyond all this, there is the practical fact, known to every farmer, that the health of his animals, and their capacity to digest other kinds of food, is greatly benefited by the use of roots. Aside from the actual nourishment which the roots contain, they possess the faculty of so combining with the acids of the stomach and with the chemical constituents of hay, grain, straw, etc., as to aid very materially the business of feeding. The amount of English hay and Indian corn requisite to produce a given amount of animal growth and fat, may be materially reduced, and economically reduced too, by a judicious use of turnips. It is very evident that a vast amount of hay and corn meal is unassimilated, where these articles are fed lavishly, as they usually are, to our stall-fed cattle. It is the use of roots, especially turnips, which may prevent this, and render the business of feeding, now so unprofitable here, perhaps somewhat remunerative. These remarks may not be applicable to those sections of the country, which are so far removed from the market as to render their grass and grain crops of comparatively small value. But among ourselves, where the markets are at our very doors, and where these crops command a high price, it is evident that the most skilful economy in their use is one of the fundamental rules of good farming.

We have referred particularly to the Swedish turnip, because we consider it better adapted than any other root to the general business of farming. The carrot and the mangel wurzel, each of which is, in its way, very valuable to the farmer, require most careful cultivation and soil of a very superior quality. They need heavy manuring, with fertilizers properly prepared and skilfully applied. They must be seeded early in the season; and if by any accident of drought, or insect, or blight, the early plant is destroyed, the seasons here are not long enough to give a good crop from late sowing. Not that we would undervalue either of these roots. For dairy purposes the mangel is invaluable; and careful experiments have shown that feeding it is often attended with results superior to those following the use of Swedes, especially in fattening full-grown cattle. Still the seed germinates with difficulty, the young plants are tender, and less weight is obtained per acre than from Swedes. So too of the carrot; when cultivated properly and selected well, there is no more useful crop, and perhaps none more profitable. It is needless to enlarge upon this root in Essex County, where our farmers have surpassed all others in the size of their carrot crop, and where feeders have already learned its value for horses, cattle and sheep.

But is seems to us that the true value of the ruta-baga or Swedish turnip is not yet fully known among us. It is to a very considerable degree a substitute for the potato, which formerly gave an ample reward for a small outlay of land, labor, and capital, but which has now become one of the most uncertain of all field-crops. It furnishes excellent food for man as well as animals, can be cultivated at a very small expense, and is admirably adapted to much of the light soil of the county. It grows with great luxuriance on new land. It may be sown late in June, after other crops have had one hoeing, and just before the busy season of haying begins,—in fact, Swedes for winter store should not be sown earlier. The crop may be easily managed with the horse-cultivator; and, inasmuch as it will bear rough usage in early life with impunity, it can be thinned with great rapidity with the common hoe—facts worthy of consideration in the present scarcity and expense of labor.

The value of the turnip in English husbandry is so well known, that it need only be referred to. A desire to impress its value upon the minds of farmers here, induces us to enter into a somewhat extended notice of it, rather than the expectation of presenting any thing new.

The cultivation of the turnip as a field-crop, although known to the ancients, and carried on with great care in Holland for many centuries, was unknown in England till its introduction into Norfolk by Lord Townshend, about the middle of the last century. Since that time it has been pursued with great industry and skill, until the best varieties are found in that country. The time may arrive when the seed of the root raised in this country will be as good as that raised in England; but it is not so now. It may be some defect in our cultivation which causes the degeneration of the plant here; but that this degeneration does take place there is abundant evidence. Possibly our soil is not in condition to develop the root thoroughly; the fact that Swedes exhaust our new soil, would in some degree indicate this. And yet it is said of the turnip crop—"it is indeed the sheet-anchor of *light soil* cultivation, and the basis of the alternate system of English husbandry, to which every class of the community is much indebted."

With us the crop prefers a light warm loam, which has not been too highly cultivated for other crops, and is not too heavily manured. We have found a great disposition in the best improved turnips of England, to run to necks and heavy, luxuriant tops, at the expense of the root, when sown on rich, heavy, clayey soils, upon which root crops had been previously raised, with excessive manuring. And while great care is taken abroad in the preparation of the land for this crop, it seems as if the rule was reversed here, and the less care the better. There can be no doubt that on light gravelly soils, which have been kept open by long-continued cultivation, a good supply of well-rotted barn-yard manure is indispensable to turnips. But such soil as this, upon which grass had been grown until a strong sward has been created, may be ploughed late in June, a light dressing of manure applied and harrowed in; and by using super-phosphate in the rows, a good crop may be obtained. In England it is very customary to sow turnips after a crop of wheat. But in this country grass is the usual successor to our grain crops. And we know of no rotation of crops into which turnips can be introduced—unless it be as a first crop after ploughing the grass land late in the spring. In this way turnips can be raised without that exhaustion of the soil of which we have spoken. And land thus treated will produce a good corn crop the following season, besides being in excellent condition to cultivate. We should not advise the cultivation of turnips on land which is to be seeded down to grass as the next step in the rotation. Grass does not set well, and it is a long time before a luxuriant and compact sward is produced after such a process. A piece of worn-out grass land, then, may be very profitably used for turnips the year it is broken up. It may then be used for other root crops if desired, or for corn, which is by far the best crop known among us, to precede the laying down of lands to grass, with some small grains. In preparing land for turnips, as we have suggested, it should not be ploughed until after the middle of June, and the seed should be sown as soon after as possible—say about the 20th of that month.

There are two modes of applying manure to the land for turnips, in the choice of which we should be governed by the soil. Where the land is very light, and does not admit of deep ploughing, green barn-yard manure may be spread upon the sward before ploughing, and turned under. In this case the fermentation of the manure will take place with great rapidity during the hot summer months—the sod which lies above it not being firm and close enough to exclude the air, which is indispensable to the process of decomposition. As the season advances the rootlets will find, as they penetrate the light, warm sod, an abundance of nourishment beneath. On heavier lands, however, a different process seems to be necessary. These should be ploughed at the time recommended, to such a depth as to give a good supply of loose soil for the seed-bed. The manure applied to them should be well decomposed—and if composted with old muck, it will be an advantage. It is seldom that cow manure alone attains a degree of warmth sufficient for this crop. It is well, therefore, to combine it with a liberal supply of well-rotted horse manure. A compost of one-third muck, one-third cow manure, and one-third horse manure, well mixed, and thoroughly decomposed, is as good an application for turnips as can be found. About six cords of this compost, spread upon the acre, and well harrowed in, will make a good bed for the crop. The addition of half a ton of bone manure to the acre, to the compost heap before it is applied, will vastly improve the mixture.

When the land has been prepared and the manure applied, as we have suggested, it should be lightly furrowed with a common wooden marker, containing three or four teeth about four inches long, and from twenty to twenty-four inches distant from each other. This instrument will line off the field into shallow furrows not more than an inch in depth. In these furrows, should be strown with the hand about four hundred pounds of good super-phosphate of lime to the acre. The seed should then be sown in the furrows, with a seed-sower, so managed that the seed shall not be deeply covered. We may recommend the superphosphate for this crop, after many trials of its merits. The chairman of this committee, used during the past season, flour of bone, Mexican guano, and Rhodes' super-phosphate, upon different contiguous portions of the same field. The super-phosphate produced the desired and expected effect; the flour of bone fell some distance behind; and the guano produced no perceptible effect at all—the crop being very light.

In manuring turnips it is particularly desirable to neutralize as far as possible the vegetable acids in the soil. Muck should never be applied to them until it has been corrected by the action of frost and heat, or by the use of lime. It will be found that the smoothest and best shaped turnips grow on land in which the mineral elements preponderate. Wherever these elements are deficient, as is often the case in soils where clay or muck abounds, the use of lime will be found beneficial, not only as a neutralizer of the acids, but as a solvent of the vegetable matter contained in them. It is for this reason that bones, super-phosphate of lime, ashes, and Mexican guano, produce so good an effect upon the crop. Of the various fertilizers the intelligent farmer must select that which is the most economical in his own locality, with the assurance that land which is adapted to turnips is also adapted to this class of manures. And he may also be assured that no kind or quantity of manure will induce turnips to grow in land chilled by stagnant water, to never so slight a degree.

We have incidentally referred to the sowing of the seed, in another portion of this report. It will be seen that only one method can be adopted, by those who select the land and apply the manure according to our directions. It would be difficult to furrow and ridge for deep drill husbandry, a piece of newly-ploughed sod-land, although it may be done, as we shall see hereafter; and we had better resort, therefore, to the ordinary method of sowing on a flat surface with the common seed-sower. We are satisfied that there is no method so economical as this, and none which will produce a smoother and more substantial root. The old system introduced into the country by Cobbett, involved the necessity of a large amount of labor, and that troublesome application of manure, which renders the cultivation of the mangel so expensive. There is no doubt that Cobbett's system produced large crops. So will the system which we recommend, if properly applied.

The following abstract of Cobbett's method is contained in an address delivered by Col. Pickering before the Essex Agricultural Society in 1820; and will be read with interest by every Essex County farmer at the present day:

The Ruta-Baga.—This root may be cultivated in the manner just described for the mangel wurzel; the ground being prepared in the same manner. In England they appear to be most commonly grown in rows twenty-seven inches apart, with the plants at a foot distance in the rows. But William Cobbett, who, in a small book published in New York, has minutely described his own practice, both in England and America, asserts, that the largest crops are attainable by growing the ruta-baga in rows four feet apart, with the plants about ten inches or a foot distant from each other in the rows; and that in this mode of culture he has raised, in England, *thirty tons* to the acre.

For this mode of culture, the manure, being deposited in furrows four feet apart, is covered by four back furrows, two on one side and two on the other, of each line with manure; by which little ridges are formed; and if the ploughing be deep (as it ought to be) there will be a deep gutter between every two ridges. The tops of the ridges being made fine with a light harrow, or with rakes, the seeds are sown with a drilling machine; or by hand, which Mr. Cobbett says he prefers to a drill. Two men sowed for him seven acres in three days, using about four pounds of seed, in this manner; a man went along by the side of each ridge, and put down two or three seeds in places at about ten inches from each other, just drawing a little earth over, and pressing it on the seed, in order to make it vegetate quickly, before the earth became too dry. But, he adds, the seven acres might have been sown by one man in a day, by just scattering the seeds along on the top of the ridges, when they might have been buried with a rake, and pressed down with a spade or shovel, or other flat instrument. But he used a light roller, to take two ridges at once, the horse walking in the gutter between.

The time of sowing the seeds must vary with the climate. On Long Island, Mr. Cobbett's trials of one year led him to prefer the 26th of June; but in our own county, I would not pass the middle of that month. Indeed, I think it expedient (in order to ascertain the fittest time) to commence sowing the seed as soon as the ground can be prepared, after the planting of Indian corn, and to continue to sow in small plots, weekly, until the middle of June. As soon as the plants are fairly up, hoes and the fingers are to be used, taking out all the plants but one in each ten or twelve inches. As soon as weeds appear, hoeing is to commence, hoeing the tops of the ridges to the width of about six inches, showing the plants distinct and clean. Then the plough is introduced, taking a furrow from the side of one ridge going up the field, a furrow from the other ridge coming down, then another furrow from the same side of the first ridge going up, and another furrow from the same side of the other ridge coming down. In taking away the last two furrows, you go within three inches of the turnip plants. Thus a ridge is formed over the original gutter. The next process is, to turn these furrows back again to the turnips. This hoeing and ploughing is to be repeated when the appearance of the weeds requires it; and afterwards the few weeds which may rise are to be hoed or pulled up. In this way, Mr. Cobbett thinks a thousand bushels of ruta-baga may be raised on an acre that will yield fifty bushels of Indian corn.

In describing the culture of the mangel wurzel, transplanting was mentioned, to fill vacant places. The same may be practiced with the ruta-baga. But unless those vacant spots be dug afresh, the transplanted roots will be much inferior to their untransplanted neighbors, as I found in my last year's experiment. And Mr. Cobbett mentions the like difference in his practice. At the same time he strongly recommends the raising of the ruta-baga, by transplanting for entire crops, as far preferable to the sowing of the seeds, and letting the plants grow where their seeds first vegetated. But then he considers it indispensable to perform this transplanting on ground fresh ploughed, and by sowing the seeds in beds, to raise plants as we do for cabbage, a month's more time is allowed to prepare the ground for their reception. In the work of transplanting, the plain dibble is a necessary instrument. The hole made by it must be fully as deep as the length of the root; and this being introduced (taking care in putting it into the hole not to bend its point) the dibble is thrust down by its side, and by a dexterous twist, or circular motion of the hand, the earth is pressed close against the root in its whole length. The largest crop of ruta-bagas he ever raised in England, Mr. Cobbett says, was by transplanting on seventeen acres; which produced thirty-three tons to the acre; the rows (on ridges) four feet asunder, and the plants a foot asunder in the rows.

In this mode of raising the ruta-baga, by transplanting the entire crop, so much time is gained for preparing the ground, that two crops of weeds may be destroyed, by that number of ploughings; the first in the beginning of June, and the second immediately before transplanting. But Mr. Cobbett recommends a previous deep fall ploughing and another deep ploughing in April, of the ground intended for the ruta-baga. The like two deep ploughings will be equally proper and beneficial for the mangel wurzel and carrots.

Among the advantages of the transplanting method, mentioned by Mr. Cobbett, one is, "that it saves almost the whole of the after culture. There is no hoeing; no thinning of the plants; and not more than one ploughing between the ridges."

A method somewhat similar to this was adopted by Messrs. Tristram and Henry Little of Newbury, who, in 1823, received a premium from the Massachusetts Society for raising the greatest crop of turnips on an acre. It is a valuable and interesting experiment. Their statement says:—

"The lot is on the north side of a small swell on our farm in said town; the soil is a yellow loam on a gravelly bottom, and had been down to grass two years; in July, 1823, the lot was mowed and the hay was made on the same land, and the produce was one ton and eight hundred. The sward was then ploughed as deep as would turn over, and twice harrowed; furrows were then opened at a distance of three feet apart, ten ox-cart loads of manure, mixed with ten loads of marsh mud and sod, were put into the furrows, which were covered with a plough; one pound of seed was sown with a machine, one row on each ridge, and a roller was made to pass over the same, which completed the sowing. As soon as the third leaf was grown they were thinned to the distance of one foot apart in the rows. After that they were three times ploughed between the rows, and hoed twice; the harvesting was in November, and the product was nine hundred and eight bushels."

The method adopted by Messrs. Little has the advantage of being more simple and practical than that described by Cobbett, whose estimate of the capacity of modern labor, is indicated by his supposition that one man could sow seven acres of ruta-bagas in one day. The crops raised in both these cases are large, but not larger than those raised in a simpler manner —twenty-four hundred bushels having grown last year on two and a half acres of land belonging to the chairman of this committee.

Turnips should be harvested early in November. The safest and most convenient place for storage in this climate, is a dry cellar, into which they should be put (first having been topped with a knife,) with the tap-root entire and such earth as will cling to them, after a day or two of drying, and after being transported from the field, and passed through the handling necessary to pack them. If stored in a pit they should be freed from dirt before being thrown into the pit, and a rough roof raised over them, covered with earth. Space for ventilation and for straw covering should be left between the roots and the roof. A tile or a small piece of stove-pipe will serve for a ventilator.

The best variety of ruta-baga now known, is Skirving's King of the Swedes. We would recommend that what seed our farmers raise for their own use should be from this root.

It is most earnestly to be hoped that the attention of the farmers of this county will be more strongly directed to the raising of root crops in the future. The cultivation of more perishable crops, and of those fitted almost solely for human consumption, is a secondary matter when compared with the raising of those more important products upon which the permanent success and development of the agriculture of the county depend. Whatever tends to increase our stock of cattle, by adding to our store of winter food for them, goes far towards elevating this great branch of industry to the entire agricultural capacity of the county, and towards giving us new and more substantial prosperity.

The committee would call the attention of the society to the following statement made by Mr. J. J. H. Gregory of Marblehead, with regard to his crop of Turban squashes, entered for premium. The suggestions of Mr. Gregory with regard to the cultivation of the squash, the mode of manuring, planting, thinning the vines, &c., are worthy of careful consideration —particularly at this time when the crop has so extensively failed under other hands than his own.

Geo. B. Loring, *Chairman.*

### *Statement of Mr. Gregory.*

I find on a survey of the land planted to Turban squashes, an area of 20,313 feet, as per accompanying certificate. Last year this tract was planted in part to Marrow squashes, and the remainder to seed cabbages, receiving no manure broadcast, and one handful of Coe's super-phosphate of lime to each hill or plant. The past season it received a passable dressing broadcast of barn-yard manure, which was ploughed under by the large "Lynn" plough, and the soil, when sufficiently dry, was well harrowed. At about the twentieth of May the hills were marked off at distances of about eight by nine feet, and half a handful of Coe's super-phosphate applied to each hill, it being spread over a space of about eighteen inches in diameter and well worked in with the fork to the depth of about five inches. Four seeds were planted to each hill, and soon after the plants were well up the soil was stirred with a cultivator, after which the weeds were hoed from around the plants.

As soon as the runners had fully presented themselves the plants were reduced to one to each hill, and the soil was again cultivated, followed by the hoe, just sufficient earth being drawn to the stem of the vine to prevent it being torn up by the wind. I have never practiced "hilling" my squash vines, having never seen the need of it. Though but one vine was left to the hill, the ground was very well covered, with the exception of a few square yards in the lowest portion of it. The striped bug gave but little trouble, requiring but few of the hills to be limed. Of the large black pumpkin bug, I have seen but one specimen for the past two years. The yield of squashes was about 5,600 pounds,—upward of a hundred pounds having been picked before the final gathering;—a yield of which I should make no note were the season an ordinary one.

The characteristics of the Turban are great specific gravity, thickness of flesh, fineness and dryness of grain, and a sweet and rich flavor,—these are usually its characteristics,—the quality occasionally falls below this standard. On the whole, I consider that the Turban in quality (it much resembles the Acorn squash) approaches very near the Marrow when in its palmiest days, and is at present the best *fall* squash cultivated,—the Hubbard, which does not mature its qualities till the close of November, being still the best for winter use, except to those who prefer an exceedingly dry squash. Whether or not the Turban has sufficient indurability to retain its present good qualities, and not deteriorate, like the autumnal Marrow, time alone must determine.

# FLAX.

## ESSEX.

### *Statement of Mr. E. G. Hyde.*

I measured off a quarter of an acre, and sowed ten pounds of seed. It came up and grew finely; when I sowed it I was not aware of any premium being offered, or I think I should have put on fifteen pounds to the quarter of an acre, thereby growing a finer quality. In rotting it needs careful attention. I am unable to say at present whether it is a profitable crop. But we know it will be very acceptable when made into cloth.

Method of Culture—The crop of 1861 was grass to which no manure was applied; that of 1862 was corn to which four cords of compost to the acre were applied. The soil was a loam; ploughed in May, six inches deep, spread on about six feet manure, valued at $4, and harrowed it in, then sowed the seed. Cost of ploughing, $1.50, seed and planting, $1.25. I pulled it in August and bound it up in small bundles, and shocked it, to remain in the field about two weeks. Cost of harvesting, $4.

## WORCESTER.

The raising of flax, which in the first part of the present century, formed a part of the crop of every New England farmer, has of late years been entirely neglected. The events of the last two years have again given it prominence in the minds of the New England farming community, which promises well for their interest. And no where is it more proper than in New England, and especially in Massachusetts, and in the heart of the Commonwealth, that a prominence should be given to the production of flax, which shall render us second to no other community in this country, not only in the quantity but in the quality of it; for there is no crop which can be so much increased in value by careful cultivation and handling. In Rensselaer, Washington, and other counties in New York, it has for the last thirty years been raised not only for the seed, but also for the lint which is scutched in mills. In Ohio, and other parts of the West, it has been raised for seed, very extensively, and fitful efforts have been made to save the lint, but in many cases only in a tangled condition and fit only for upholsterers' use, the manufacture of ball rope, flax cotton, fibrilla and other inferior uses.

The greatest want felt by the farmer of Worcester County, who raises flax, is the means of scutching it. This is done when flax is extensively cultivated, in flax mills, and the owners are termed mill men, who buy the flax of the farmers in the straw, paying a certain price per ton after it is rotted, or paying an agreed price per acre for the use of the land, the farmer ploughing, manuring and harrowing it, and making it ready for the seed. Here his labor ends. It is desirable that one or more mills should be established in each town; and in this respect Mr. Kimball, of Brookfield, has set a laudable example, as he has not only raised his flax but has set up a flax mill. The power required for driving one break and one set of knives, is about twelve horse. It is also used for getting out the seed.

The seed end of the flax is passed between two rollers, which crush the bolls, and the seed drops out below.

In conclusion, your committee would express the hope that at no distant day flax will again, as in former years, form a part of every New England farmer's crop, thus adding an important item to his income, besides conducing to the public welfare.

Presented by

HENRY H. STEVENS, *for the Committee.*

### *Statement of Aaron Kimball.*

The following is a statement of the expense and the product of 136 square rods of ground sown with flax by me in 1862:—

DR.

| | |
|---|---|
| To Ploughing ground, . . . . . | $2 00 |
| Harrowing, " . . . . . | 2 00 |

| | | |
|---|---|---|
| To One bushel seed, | $3 75 | |
| Pulling flax, | 11 25 | |
| Taking off seed, | 4 00 | |
| Sowing seed and bushing in same, | 1 00 | |
| Thirteen loads of manure, | 13 00 | |
| One hundred and thirty pounds guano, | 4 55 | |
| Cleaning seed, | 1 00 | |
| Dressing 401 pounds flax, | 12 03 | |
| | | $54 58 |
| Cr. | | |
| By 401 pounds of flax, worth at the time, | $106 26 | |
| 130 bounds of tow, | 5 20 | |
| 8 bushels of seed, | 36 80 | |
| | | $148 26 |
| Balance, | | $93 68 |

### *Statement of J. Forbush.*

Statement of J. Forbush, of Bolton, in regard to flax raised on half an acre of land.

Soil light and sandy, cultivated for carrots for the last few years. Ploughed and harrowed *once*. Sowed June 2d, at the rate of five pecks to the acre, *without manure*. Pulled August 24th.

Product.—Eight hundred pounds straw, seed off; three and three-fourths bushels seed.

Samples of both straw and seed are presented herewith.

### *Statement of O. B. Hadwen.*

The amount of land sown to flax measures 90 square rods, and it was cultivated in the following manner:—

In 1862 it was planted with corn, well dressed with stable manure. I ploughed the land as soon in the spring as the ground was sufficiently dry, and used the gang cultivator twice at intervals, bringing it into fine condition for the seed, and destroying the first crop of weeds,—the gang cultivator ploughing about four inches in depth. May 29th, the seed was sown broadcast, at the rate of one and one-fourth bushels per acre. The seed was worked in with a light harrow, followed with the roller, the stones picked, leaving the land very smooth and level. In four days (June 4th) the seed was up, and grew finely. June 13th, the field was dressed with twelve bushels of unleached ashes, and I think with decided benefit to the crop. The flax grew finely until checked by the drouth, which caused the crop to mature earlier, growing very upright and making few lateral branches, and less seed bolls, and perhaps two-thirds its usual height. After the abundant rains the flax matured, but in the meantime the weeds came forward with almost appalling rapidity, rendering the crop unsightly in appearance, and increasing the labor in pulling the flax. I am fully persuaded that cultivating in drills would be attended by the most successful and profitable results, as the flax could be kept free of weeds in its earlier stages of growth, the crop would be largely increased and harvested with great economy of time and labor. I commenced pulling when the stalk was a brownish tinge, the leaves fallen, and the seed bolls of a brown color. The result of my experiment is as follows:—

Time required to pull one square rod, one hour and ten minutes. Weight of clear fibre per rod, 19¼ pounds; per acre, 2,080 pounds. Weight of clean seed per rod, 2 pounds and 4 ounces; per acre, 360 pounds. Total weight of clean fibre and seed per acre, 2,440 pounds.

WORCESTER, September, 1863.

The following circular issued by the society, is appended to this report, containing as it does valuable information, from reliable authority on the subject.

## CULTIVATION OF FLAX.

*Worcester Agricultural Society, Secretary's Office,*
Worcester, April 15, 1863.

Dear Sir:—The subject of raising flax in Worcester County has of late received a large share of attention; and the Worcester Agricultuaal Society has offered premiums for the best experiment upon it. There is a difficulty however in the minds of many farmers, arising from a want of familiarity with this product. To remove this difficulty I have requested C. H. Waters, Esq., of Groton, who has had a large experience, having been engaged in the cultivation of flax for several years, to furnish me for the use of our members, brief practical directions for the preparation of soils, and manner of treatment of the crop in its various stages. These directions may be found below, and are believed to be adequate to the instruction even of those who have never seen a crop of growing flax.

Some farmers may be deterred from trying this experiment, by the apprehension that they may not be able to dispose of their crop at maturity. I am authorized, however, by a leading manufacturing firm in Worcester County, to state that they will engage to take the whole product, whether of seed or straw, at the market price, whatever it may be, delivered in Worcester. The farmer may thus, if he desires it, avoid the whole process of rotting, and save a large share of the expense of harvesting.

It is estimated that either crop, seed or fibre, will pay for the whole expense of raising and curing, thus leaving the other a clear profit.

Although the premiums offered contemplate an experiment on not less than half an acre, the committee will be authorized to recommend gratuities for experiments on less surface, which shall appear worthy of such notice. Yours truly,

JOHN D. WASHBURN, *Secretary.*

### *Selection and Preparation of the Soil.*

Like many plants, flax will grow upon most soils not absolutely barren, the most favorable being a strong gravel, and it may be laid down as a general statement, that any ground that will grow a good crop of corn, barley, oats, or potatoes, will grow a good crop of flax. Select a piece of land upon which corn or potatoes was grown the preceding year; it should be in good tilth, well ploughed and finely harrowed, as though intending to seed down to grass; after harrowing it would be well to brush lightly, in order to get a level surface; if the ground has been laid off without ridges, it should be marked off into divisions six to ten feet broad, in order that the seed may be put on equally.

SEED.—Care should be used in the selection of seed to procure a large, well-filled and shining berry, perfectly free from all weed or other foreign seed; if foreign seed should be found mixed with the flax, the farmer can usually separate them with a hand sieve, twelve meshes to the inch. To get the best results in both seed and stem, sow five pecks per acre, but if *seed* alone is desired, sow three pecks; if the farmer is looking to the quantity and quality of fibre alone, he may sow up to eight pecks per acre according to the condition of his land; if his land is very strong this latter quantity of seed will give an immense burden of fine stem. Great care should be used in sowing as the seed is very slippery and is apt to glide unevenly from the hand; land may be put down to grass with this crop the same as with oats or other grain; after sowing the land should be harrowed and rolled, giving the same treatment as for oats or other grains.

The crop requires no further attention until the time of

Pulling.—The *fibre* is in the best state before the seed is quite ripe; and the time for pulling when the seed bolls begin to turn brown, and the leaves have turned yellow on the lower half of the stalk; the seed at this time will have passed out of the milky state, and there will have been left in the stalk sufficient vitality to carry the seed to perfection.

In pulling, the stem should be grasped about midway its length—taking as many stalks as the hand can easily grasp—and pulled upward in a straight line, in order that the plant may not be broken (as that would conflict with the success of after operations;) it should then be laid on the ground in such quantity as will make a bundle three or four inches in diameter; at night, or when the work shall have been completed, bind up the stem (using some of the same for bands,) and stack in small shocks, in such manner as will allow the air to circulate freely through them; when dry it should be taken to some convenient place for taking off the seed.

The seed may be taken off in a variety of ways, either by pounding the seed ends with a stick or by threshing upon a block or stone; a very simple machine is made, composed of two wooden rollers between which the bolls are run, taking out the seed very rapidly and without injury to the stem; in taking off the seed by either process the stem should not be broken. Seed can be cleaned from the chaff as other grains.

Rotting.—After the seed is taken off, the stem is ready for rotting, which at the present time can be best accomplished by the aid of dews and rains; to accomplish this, select a level piece of mowing land, (where the aftermath is not too heavy,) and opening the bundles spread the flax thinly and evenly in rows, spreading not more than one pound in two feet, running measure; the rows as spread should have at least six inches of clear space between them; it should be allowed to remain in this condition until the fibre or outside of the stalk turns *silver gray*, when it should be turned over and allowed to remain until the other side is like the first; a small pole ten or twelve feet long, like a common fishing-pole, may be used in turning the flax, running it for six or eight feet in length under the tip ends of the flax and turning it upon the buts.

When it is sufficiently rotted—of which the farmer can judge by rubbing or breaking a stalk between the thumb and finger, when, if it is fully rotted, the shive or woody part of the stem will fall from the fibre, leaving it perfectly clean—it should be bound in bundles and is then ready for the scutch-mill or manufacturer.

# BLOOD STOCK.

## WORCESTER NORTH.

*From the Report of the Committee.*

We find thirty-six entries on the books of the society—eight for premium and twenty-eight for exhibition—consisting of twenty-eight Shorthorns, four Devons, one Jersey, and one Dutch, all of which did great credit to their respective races, with perhaps one exception. But owing to the rules of the society, requiring "*authentic pedigrees*," we are sorry to say, we were obliged to rule out of competition all the animals except the Shorthorns, the others not *any* of them presenting documentary evidence of purity of blood, and in several instances *nothing* was put before us to establish the claim except the bare entry "*full blood*."

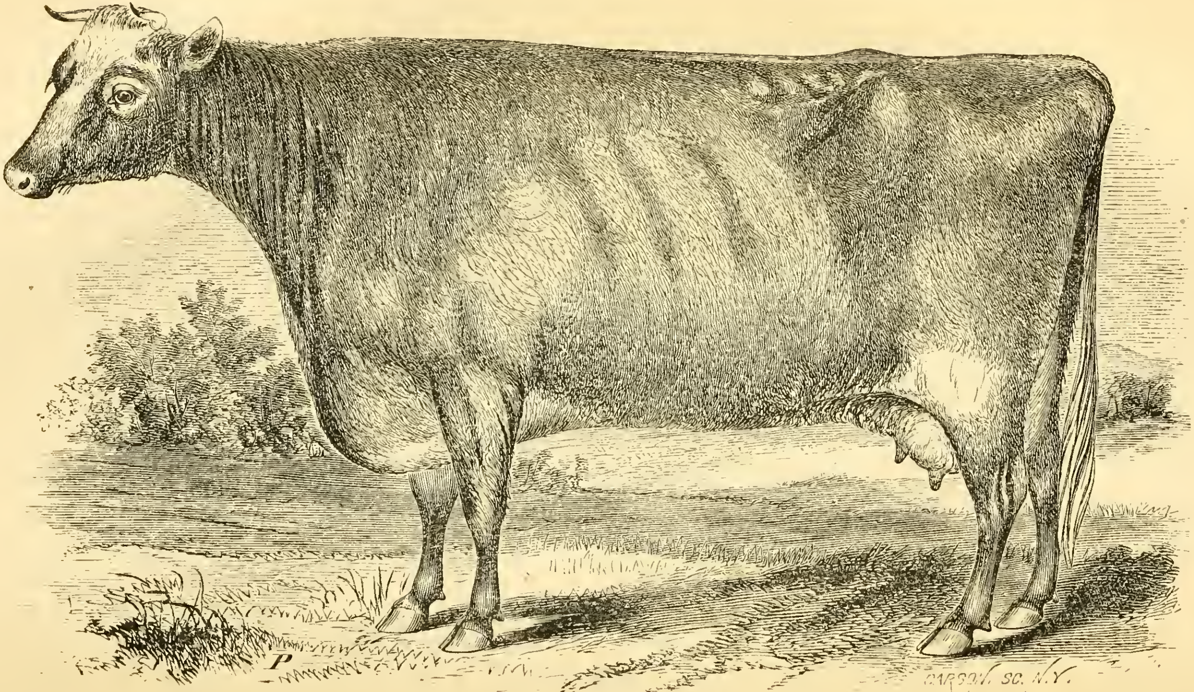
We would here say that we felt extreme delicacy in ruling out the animals referred to, but felt in duty bound so to do, with the vote of the society in view. For with the best intent on the part of the contributor, unless he can substantiate his claim of purity of blood, by a carefully kept record of pedigrees, how can we or any one else *know* whether the animal in question is of the race claimed, or with a sprinkling of some other blood of very different form and characteristics, whereby the breeder will surely, sooner or later, be disappointed with his calves, they showing other than the points of a thoroughbred of the race claimed? We would state that if the restriction is too severe the rules whereby your future committee is to be governed must be made more lenient, a course which we would *not* be understood as *recommending by any means*. For in these modern days when breeders are forming associations to guard against spurious pedigrees, and the demand of the public is for *well authenticated* pedigreed animals, this society should be slow to aid either designing or undesigning parties in palming off animals with doubtful pedigrees, as thoroughbreds.

Were we to close this report without alluding to the lesson which this day's show has taught, we should fail of discharging our duty to other members of this society and the farmers of this vicinity.

Has any man carefully examined the stock in the pens and the steers at the posts, to-day, without coming to the inevitable conclusion that "blood will tell?"

Lay aside the beauty, the pleasure to the eye, which, by the way, to a person with an eye in his head and a soul in his body is very pleasing, and take the *economical* view, we have seen thoroughbred cows, and cows of high grade, the get of pure bred bulls, which show the unmistakable marks of being great producers of milk, many of which having from one to four of their offspring on the ground, all of which have inherited the characteristics of their respective breeds, and with an anatomy so skilfully arranged that they readily take on flesh in the most desirable points, thereby making a *greater percentage* of high-priced or valuable flesh, which is readily appreciated by the butcher, in proof of which you have but to visit Cambridge, Brighton, or New York markets and see with what ready sale animals, high up in "blood" meet, while the poor, flat-ribbed, heavy-offaled "scrubs" are sold late in the day and at prices that never pay the feeder, if in fact they find a sale at all.

Will any one after viewing the fat cow Aba, shown by Mr. White, tell us that the "native" stock of New England possesses all the characteristics desirable in stock? We have it from undoubted authority that she never ate *but very little* extra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CARSON, SC. N.Y.

Shorthorn Cow "LADY LATHROP." See p. 186.

feed, with the exception of roots, and that she is a *small* consumer, substantiating the fact often stated that an animal consumes in proportion to their *offal*, not *weight*. Or will they fail to see the effect of judicious breeding for milk when they see Lady Sale, 5th, a cow which has given over seventeen quarts of milk per day in March, 1862, from which was made one pound of butter from *eight* quarts of milk ; or the heifer Lady Lathrop, three years old, having calved last October, and given milk through the winter, and then giving twelve quarts of milk per diem in the month of June, and that of a quality nearly equal to her dam, Lady Sale, 5th ?

In further proof of the transmission of blood we could mention Highland Maid, a two year old heifer, out of Lady Sale, 5th, she having calved in last March, has given twelve quarts per day on an average during the month of June, and of a quality which gives credit to a heifer of her age. Also Florence, two years old, having calved last March, has given as much as the last-named heifer and of good quality.

Likewise the high grade cows, many of which are the produce of thoroughbred sires, presented by Abel F. Adams, Joel Page and Mr. Vose, of Winchendon, two of which belonging to the latter-named gentleman, not only being " the best of milkers," but having two pair of steers, their calves, the one two years old, the other six months, all of which were easily distinguished by their resemblance to their dames, add but another proof that " like begets like " in a high-bred animal. Will any one answer by saying this is the effect of judicious breeding, and that our " natives " can be bred up to equal perfection ? Let us answer by saying, it is the effect of great care on the part of eminent breeders in the old country, continued through a *series of years* sufficient to weed out the undesirable points and *firmly establish* the desirable qualities, and who will attempt to rear a race of thoroughbreds here in New England, when at a comparatively small sum animals can be procured of any of the acknowledged breeds which contain the same qualities you would strive to obtain ?

It is true that thoroughbred animals are as yet so scarce that all cannot avail themselves of thoroughbred cows, but all, or nearly all, can use pure-bred bulls, and no man can *afford* to patronize a native, so called, when he intends to rear his calves, certainly, and where the services of a pure-bred can be had for a reasonable advance from natives or grades; it will pay the farmer when he intends his calves for veal, as the increased weight with the form will generally insure a sufficient remuneration for the extra outlay. Before closing, lest any undervalue a pedigree, allow us to state that the value of a pedigree consists in its *guarantee* that the animal *is* of the race or breed claimed, and has in itself the power of transmitting the qualities for which it is itself noted, and that the longer the pedigree, the quality being the same, the more sure your animal is to transmit its qualities. As the object of all agricultural societies is to improve our agricultural interest, it becomes a question of importance whether we offer premiums for grade or mongrel bulls at all, for by so doing we are encouraging the rearing of inferior animals. A. O. CUMMINS, *Chairman.*

Among the Shorthorns exhibited at the fair of this society were the following: The Shorthorn bull,

"MONITOR." (Frontispiece, Abstract.)

Red and white, bred by Sam'l Thorne, Thorndale, Washington Hollow, Dutchess Co., N. Y,, the property of H. G. WHITE, South Framingham, Middlesex Co., Mass. Calved January 26, 1860. Got by 2d Duke of Thorndale, 2788 (vol. 4, p. 89, A. H. B.)—out of Acacia (bred by Mr. Thorne,) by 2d Grand Duke, 2181 (12961) (vol. 3, p. 222—Aurora (bred in Eng. by G. D. Trotter,) by 3d Duke of York (10166)—Allspice by 2d Duke of Northumberland (3646)—Young Amazon by Crusader (934)—Amazon by Sultan (1485)—Bellona by Mars (411)—Rolla by North Star (458.)—*A. H. B. vol.* 6.

"ABA." (Frontispiece, Secretary's Report.)

Roan, bred by S. T. Taber, Chestnut Ridge, N. Y., the property of H. G. WHITE, South Framingham, Middlesex County, Mass. Calved June 23, 1857. Got by Earl of Warwick, 465, Atlanta 3d by Logan, 2, 652—Atlanta by Enchanter, (3729)—Adeline by Young Comet, (3437)—Emma by Wellington, (683)—Annabella by Major, (398)—Ada by Denton, (198)—Aurora by Comet, (155.)—*A. H. B. vol.* 5.

"LADY LATHROP." (p. 184.)

Red, bred by A. O. Cummins, West Millbury, the property of H. G. WHITE, South Framingham, Mass. Calved November 10, 1859. Got by Young Monarch, 3605—Lady Sale 5th by Red Jacket, 890—Lady Sale 3d by Imp. 3d Duke of Cambridge, (5911)—Imp. Lady Sale 2d by Earl of Chatham, (10176)—Lady Sale by General Sale, (8099)—Clara by Napier, (6238)—Maid of Orleans by Marmeluke, (2258)—Helena by Waterloo, (2816)—Moss Rose by Baron, (58)—Angelina by Phenomenon, (491)—Anne Boleyn by Favorite, (252)—Princess by Favorite, (252)—Brighteyes by Favorite, (252)—Brighteyes by Hubback, (319)—Brighteyes by Snowdon's Bull, (612)—Beauty by Masterman's Bull, (422)—Duchess of Athol by Harrison's Bull, (292)—Tripes by the Studley Bull, (626)———— bred by Mr. Stevenson of Ketton, in 1739.

"Lady Lothrop's" dam made in one day, in March, 1862,—on barn feed—two pounds, two ounces of butter—making a pound of butter from *eight quarts* of milk.

"BRIGHTEYES 5TH." (p. 192.)

Red roan, the property of H. G. WHITE, South Framingham, Mass. Calved March, 1855. Got by Halton, 556, (11552)—Dam imported Brighteyes 3d by Earl Derby, (10177)—Brighteyes 2d by Lord George Bentinck, (9317)—Brighteyes by Conqueror, (6885)—by son of Beart, (65)—by Mason's son of Comet, (155)—by Wellington, (683.)

## HAMPSHIRE, FRANKLIN, AND HAMPDEN.

### *From the Report on Stock.*

We shall but repeat the common opinion when we say that the exhibition of stock, as a whole, was one of marked superiority. This fact was most noticeable in the divisions of fat cattle and herds; in the latter the committee think it was never so rich. The herds of the Andersons alone would be enough to redeem any show from failure; and indeed the same might be said of almost any of the others—while the aggregate presented a feast for the eye seldom equalled.

Your committee were pleased to see almost all the distinct breeds represented at the present fair. While Durhams predominated, there were not wanting specimens of Herefords, Ayrshires, and Alderneys. Even the little Kerry cow, from the mountains in Ireland, figured, we believe, for the first time on the show grounds of the society. The peculiar qualities of the other breeds are so well known, and have been so well described in reports already published, as to need no introduction from us; but the Kerries, though getting to be known in the eastern part of the State, are rare here.

Youatt says of the Kerry cow: "She is emphatically the poor man's cow; hardy, living everywhere, yielding, for her size, abundance of milk of good quality." Milburn says: "She is a treasure to the cottage farmer—so hardy that she will live where other cattle starve. She is a perfect machine for converting the coarsest cattle-feed into rich and nutritious milk and butter."

There were but two strings of working cattle offered. These were not composed of so many pairs as in some former years, but the quality was good. Hadley won the day in this department, for which she is indebted, probably, to Chester Gray more than any other man, and whose team of three or four pairs contributed their full share to secure the first premium.

The meagre report of the committee on working cattle affords us no data by which we can go into particulars; and as we had not the pleasure of seeing the drawing match, we must pass over this division with the very general remark made above in regard to the town teams.

The show of cows was not large, and a want of compliance with the rules of the society, renders the facts in regard to their butter-making qualities rather scanty. Altogether the most valuable cow, apparently, was that presented by Mr. Hale, cashier of the Holyoke Bank. Mr. Hale presented to the committee an account current kept with his cow, which shows the astonishing result of a net profit in thirteen months of $150.90. Whether this result has been reached by a fortunate selection, or by connecting her ladyship in some way with the banking institution of which he is an officer, we are unable to say. Certain it is that the cow and the bank resemble one another in this particular; they are both institutions for making money. Equally certain is it that regular bred farmers, either from want of education, facility in "ciphering," or some other cause, are rarely able to show such a profit in any of their operations. More true than either of these, if truth admits of degrees of comparison, is the fact that Mr. Hale is a gentleman, and his word is not to be doubted.

In the division of bulls, the most noticeable animal, to the casual observer at least, was the "Earl of Carlyle," exhibited by Wells Lathrop, Esq., of South Hadley. We suppose he is all right on the "books," but though he is an Earl, it seems to us a little strange that Mr. Lathrop should be willing to have his blood mingle with that of his famous Yaricos. This may be heresy however, and we forbear.

Aside from the specimens in the several herds, which were numerous and fine, the exhibition of young stock was small, and nothing very noticeable came under the observation of your committee.

The same may be said of the exhibition of swine, with an exception in favor of that made by Mr. Wright, of the Hospital, which was large and of great excellence. His Yorkshires come as near perfection perhaps as a swine's nature is capable of.

The show of sheep was much as usual. It seems impossible to get up any enthusiasm on sheep raising in Hampshire County. There are a few skilful breeders within the limits of the society, but as a whole we are vastly behind Franklin County, in a department of husbandry acknowledged by all to be one of the most profitable, if rightly managed.

In conclusion, your committee would say, that where there is so much to commend, it is quite probable that much has been left unnoticed which is well worthy of mention. We can only say that, in the absence of full reports by many of the committees, we were obliged to content ourselves with such general facts as came under our observation.

T. G. Huntington, *Chairman.*

## HAMPDEN.

### *Statement of A. N. Merrick.*

Herefords.—In the summer of 1862 I purchased of G. Clarke, Otsego Co., N. Y., two pure-bred Hereford yearlings, a bull and heifer, and a few months later five heifers from the stock of A. D. Withers, Broome Co., N. Y. I regretted the cattle were not in better condition at the time of the show, but most of them had just been transported a distance of over three hundred miles, without food or water for four days.

The Herefords derive their name from a county in England. The following gives a very correct description of them: "The face, mane, throat and under portion of the body, the inside and lower part of the legs, and the tip of the tail are beautifully white; the other parts of the body a rich red, usually darker in the male than the female. The horn is white, or light yellow, of a waxy appearance, sometimes tipped with black. The forehead is broad, with spreading horns, those of the bull straight and level with the poll, and of the ox and cow, slightly curved, with an upward tendency. The eye is full yet passive, denoting the quietness of disposition and of temper characteristic of the Hereford, and which is of paramount importance to insure the profitable feeding of all ruminating animals. The cheek is fine, the head small in proportion to the carcase, which is long, level and cylindrical; the hide is thick, yet mellow, well covered with long soft hair, having a tendency to curl. The brisket is prominent, the chest well expanded, and the breed is prominently distinguished for neatness of shoulder, the bone being thin and flat, the kernel full up the outside shoulder, well covered with mellow flesh; the chine good, the loin broad, the hips wide and level, the whole back displaying a straight line, well covered with flesh, from the head to the tail; the twist, flank and fore-flank are good, the outside thigh is the most defective part. The whole body is well covered with thick, mellow flesh, yielding with pleasant elasticity to the touch; the legs are short and the bone small, and the whole contour displays great constitution, and exhibits, perhaps, a larger amount of flesh, in proportion to bone, than any other breed."

They have been long and favorably known in England, mention being made of them as early as 1776, but the importations to this country have been comparatively very few until within a late period. The State owned, a few years since, some fine specimens of this breed, which were sold to parties in Maryland, just previous to the breaking out of the rebellion. They are celebrated for their oxen and steers; they rank next to the Shorthorn in size; from their uniformity of color they are easily matched. As they are bred chiefly in England for their beef, their dairy qualities have been overlooked to a great extent, yet it is claimed by persons who are fully competent to give an opinion, that they are fully equal to the Shorthorns. Sanford Howard, than whom there is no better authority, writes me, under date of March 9th: "The Herefords are much better adapted to the soil and climate of New England than the Shorthorns. Rivalry or some other motive has started and kept alive an unwarrantable prejudice against them. The advocates of Shorthorns claim that they are much better milkers than the Herefords. The old style of Shorthorns probably would give more milk, but not make any more butter. As to the present fashionable variety of Shorthorns, I regard them as no better milkers than the Herefords. Rev., late Lord, Berwick, of Altringham, near Shrewsbury, England, who kept about three hundred Herefords, told me he had repeatedly offered his brother, the Hon. and Rev. Noel Hill, a large breeder of Shorthorns, on an adjoining estate, to show Hereford cows against Shorthorns for milk and butter, but the offer was never accepted. A close personal examination of both herds induces me to believe that the Herefords would have beaten. I might cite other cases."

My own experience with them has been very favorable, having proved them hardy, easily kept, fair milkers, good breeders. My two year old heifer Brunetta is an extra milker, yielding in the best of the season, eighteen quarts of milk per day of exceedingly rich quality.

I can see no reason why they should not be more generally sought for by our farmers, where beef and labor are the prime objects for which cattle are kept. Their hardihood of constitution renders them particularly adapted to New England and eastern New York. Are they not worthy of a fair trial?

Springfield, October 6, 1863.

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# MILCH COWS.

## MIDDLESEX NORTH.

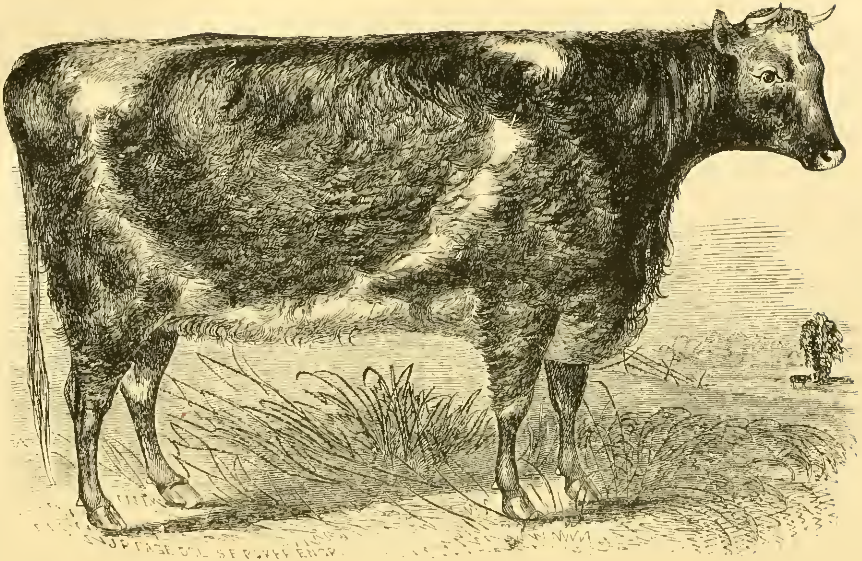
### *From the Report of the Committee.*

Your committee, in submitting a few remarks on the subject under consideration, are well aware that it will hardly be possible for them to make any very novel or original suggestions. Thanks be to the wide diffusion of agricultural journals and works on agricultural topics, and to the existence of a multitude of societies like our own in almost every neighborhood, our farmers are thoroughly intelligent in all branches of their vocation. Agriculture is now a science. Wherever we turn the eye in our county, we meet the most unmistakable evidences of thrift, intelligence and prosperity in the agricultural community.

Elegant residences and spacious barns, airy and well-ventilated in summer, and warm and comfortable in winter, and combining every accommodation that the most fastidious stock-breeder could wish, meet the eye in all directions in the rural districts. It has been remarked that the barns of New England farmers form a most important feature in their agriculture. Thousands are annually built on the most improved plan for the storing of hay and other crops, and for the shelter of cattle and the saving of the manure. In this Commonwealth alone, in 1860, there were 84,327 barns, an increase of more than 10,000 during the ten preceding years.

Our own county is not a whit behind any other in the State, if equalled by any, in the excellence of its barns. In our stern climate such spacious and comfortable shelters for neat cattle augur well for the future of our stock. These barns, in connection with good feed, judicious ventilation and proper care, will guarantee to us a constantly improving stock.

It is hardly necessary to say that the milk dairy is a leading agricultural interest in a county like this, full of manufacturing villages and cities. It has been well said, after making proper allowances, that the consumption of milk as food is of much greater importance than its manufacture into cheese and butter, in populous industrial communities like our own. Butter and cheese can be brought from great distances; but the milk demanded as food must be produced within a comparatively short distance of the place of its consumption. If conveyed by wagons, fifteen miles is about the limit of its cartage. The shorter the distance between the place of production and that of consumption, the better for the consumer, as the jolting of the wagon precipitates the richness of the milk to the bottom of the can. The produce of milk as food has attracted the special attention of our Middlesex farmers, and has abundantly rewarded their labors.



Shorthorn Cow "BRIGHTEYES 5TH." See p. 187.

The chairman of your committee attended the old Middlesex Agricultural Fair held at Concord, on the 17th inst., and was very happy to observe that the farmers had paid special attention to the raising of heifers, the exhibition of such animals being superior to that of any previous year.

In this Commonwealth, in 1860, statistics inform us that there were 135,000,000 quarts of milk consumed as food—103,000,000 made into butter, and 20,000,000 into cheese. Milk contains in solution not only a due proportion of carbon, hydrogen, oxygen and nitrogen, but all the other elements necessary for the construction of bone, nerve, &c., and is hence always a proper food in all circumstances of health. When we take into account the dependence of our juvenile population on the lacteal secretions of the milch cow for sustenance, it will be seen that milk plays a most important part in our nutritive economy. The milch cows of Middlesex County are never fed on the abominations which, converted into milk in New York and other large cities, prove so blighting and deadly to infancy and childhood.

Pure, sweet milk is an article of prime necessity, and is so considered everywhere over the civilized world; and the first object of every agricultural association, it has been well remarked, should be to improve the products of the dairy. The transactions of our local agricultural societies, as annually published, sufficiently attest that this all important object has always received its due share of attention from us. It has been remarked that cattle when well treated afford the means of keeping up the fertility of a farm; and generally a cattle district grows richer and more fertile every year, while a grain district, without the introduction of foreign manures, grows poorer.

Manure as afforded by animals is the great source of fertility and renovation for land. By the help of the animal economy we are able to restore to the soil, in the state of plant food, a large portion of these constituents taken from it by the process of vegetation. The close dependence of the animal and the vegetable kingdoms upon each other, and the difficulty of successfully perfecting the one without the other, has been recognized by all enlightened agriculturists as the foundation of all good farming. From a neglect of this dependence, already the vast grain districts of the West are showing signs of incipient exhaustion, while some of our soils are completely worn out.

England and Scotland have been called the stock nurseries of the world. There cattle-breeding has long been a science, and it has become such, or soon will do so, with us. The United States present unrivalled facilities for the raising of every variety of neat cattle. "We have broad prairies and fertile savannas, rich intervals and sweet-herbaged hillsides, as well as sandy plains, bare, stony ridges, parched wastes of coarse and scanty grass, and bleak northern pastures—all, or nearly all, fitted to the support of animal life, and yet each requiring for its most profitable occupation a race of cattle especially suited to it. We have every variety of temperature, and consequently every variety of vegetable products suited for the food of animals. It is all-important that our stock farmers should by patience and care raise stock adapted to our soil and climate."

A leading writer on the subject of breeding says, a due consideration of the natural effects of climate and food is a point worthy of the especial consideration of the stock husbandman. If the breeds employed be well adapted to the situation, and the capacity of the soil is such as to feed them fully, profit may safely be calculated upon.

The milch cow is to be looked upon as a machine for turning herbage into money. Now it costs a certain amount to keep up the motive power of any machine, and also to make good the wear and tear incident to its working; and in the case of animals, it is only so much as is assimilated and digested, in addition to the amount thus required, which is converted into milk and meat, so that the greater the proportion which the latter bears to the former, the greater will be the profit to be realized. The milch cow is a highly artificial animal, and is what her circumstances and keeping make her. Place the Ayrshire cow, for instance, so famous for her milking qualities, in the rich bluegrass pastures of Kentucky, and she will soon be fitter for the shambles than for the milk-pail. Her fine milking qualities will disappear in her too luxuriant range of pastures, and she will lay on flesh, looking like a miniature Shorthorn. It is said by a celebrated French naturalist that the cow in St. Domingo undergoes material change. She no longer gives milk as she does with us, but dries up as soon as the calf ceases to suck, reverting to a complete state of nature.

In this country we have no indigenous, distinct breeds of cattle. The only native American bovine stock found here on the discovery of the continent, was the buffalo. What are called *natives*, are a heterogeneous mixture of various breeds, introduced at various times and for different purposes, and left to cross or mingle as chance or convenience dictated. From a mass of mongrel blood and ill-assorted races sprung our so-called natives. In breeding from them, the difficulty is to perpetuate a fixed type, so prone is a chance-medley of blood to revert to its original elements. The natives, though possessing some desirable qualities, are generally faulty in form, slow in reaching maturity, poor handlers, and raw-boned. They possess the one desirable trait of *hardiness*, and the cows are tolerable for the dairy. Owing to their origin, the natives have no fixed hereditary traits, and even those possessing desirable traits cannot be relied upon as breeders to produce progeny of a like excellence. Instead of constancy, there is continual variation and frequent breeding back, exhibiting the undesirable traits of inferior ancestors. Among the natives are found many excellent milkers; and were a careful selection made, and a determinate course of breeding adopted, there is little doubt but that out of our common material there could be originated with judicious crossing a much improved breed, suited to any given district, that might rank well as dairy animals.

Stock-breeding requires time, patience and skill. It is said to take from seventy-five to one hundred years to develop a distinct breed. The tribe of cattle known in this Commonwealth as "the Cream-pots," were produced by crossing a native cow of great excellence as a milker with an imported Shorthorn bull, and by continuing to cross him with his own progeny until a tribe of cattle was produced possessing a certain similarity. These animals, however, hardly constituted a distinct breed. Though the variety of breeds of cattle in England is great, importations have chiefly been confined to half a dozen of the most popular ones, to wit: the Shorthorn, the Devon, the Hereford, the Ayrshire, the Galloway, and the Jersey. Kerry cows have recently been imported into this State from Ireland. The Chenery herd from Holland, has obtained a bad celebrity from its connection with the pleuro-pneumonia. The Shorthorns are the most widely distributed, and the most universally popular of the known varieties of cattle. This favorite race is rapidly planting itself wherever there is any improvement in agriculture, or the rearing of cattle encouraged, or the English language spoken. In the rich grazing districts of the West it thrives better than it does in England itself. The Ayrshire cow is the favorite dairy animal; she has all the external marks which indicate a good milker. The stomach in this breed seems wholly out of proportion, but the Ayrshireman admires a big belly, as the laboratory where the stock of food is converted into milk. The loin is broad and forms well in with the wide hips and capacious pelvis; the rumps are wide, and tolerably high; the tail long and slender; the legs straight; the thigh rather thin; and the udder is broad and large, extending well forward with thin, flexible skin, and teats wide apart and short. In the genuine Ayrshire cow, everything is sacrificed to the udder and belly—the breeder evidently believing in "no udder, no cow."

With our native stock the Ayrshire has been crossed with success, an admirable hardy dairy cow being the result. In this Commonwealth four *grade* Ayrshire cows, gave over three thousand pounds of milk in twenty days, being an average of thirty-eight pounds per day for each cow. From the milk one hundred and twenty-nine pounds of butter were made. The cross is growing in popularity with us. To such dairy districts as ours, either the pure bloods or grades are admirably adapted. The milk of the Jersey cow is particularly rich in butyraceous particles, and is of a deep yellow. The butter made from it is always of a deep golden color, and this character is so strong that a few cows will be enough to give the butter of a whole dairy that desirable flavor and hue. As such butter will always command in market from twenty-five to thirty per cent. more than any other, we should draw our supplies, whether for cross-breeding or of thoroughbreds, from herds already introduced into this country, and habituated to the great change from their moist native English pastures, and, as it were, Americanized. We have now in this country such fine herds of almost all the desirable breeds, that there is no necessity of looking abroad.

Stock-breeding has now assumed such importance amongst us, and so much intelligence and capital are devoted to it, that whenever necessary, importations will be made by the extensive breeders, and the farmer of moderate means can reap the benefit. A distinguished writer says the best beast for the farmer is that which suits his farm best; and with a view to that, he studies, or ought to study, the points and qualities of his own cattle and those of others. The dairyman will regard the quantity of milk, the quality, its value for the production of butter and cheese, and the time that the cow continues to milk, the character of the breed for quietness, the natural tendency to turn everything to nutriment, the ease with which she is fattened when given up as a milker, and the proportion of food requisite to keep her in full milk, or to fatten her when dry. He will endeavor to select from his own stock those that excel in the most valuable points. He will seek some change in his stock every second or third year, and that change is most conveniently effected by introducing a new bull, which should be of the same breed and pure, coming from similar pasturage and climate, but possessing no relationship. But without bountiful feeding, good care and regular attendance, blood will be of no avail.

The milch cow should be treated with kindness. Blows and harshness only make her vicious and withhold her milk. The chairman of your committee would beg leave to quote from a report made by him to a kindred society, in 1862, in regard to bulls: "It is important that the teats of the bull should be set well forward and wide apart. This is a new point in the male, which has been tried in this county for the last eleven years, and found to be the true test. The teats should not only be wide apart, but the further they are set forward of the scrotum, and the more fully they are developed, the more certain is the bull to produce good dairy stock." The day is not far distant when the illimitable and infinitely varied pasture grounds of the United States will be covered with high-bred cattle, and scrubs will have disappeared; when the commonest meat stall will furnish its customers with beef as good as the celebrated black cattle beef from the Highlands of Scotland, eaten by the aristocracy of the West End of London; when our butter dairies and cheese dairies will rival the finest of Holland in the neatness and excellence of their products.

PETER LAWSON, *Chairman.*

## PLYMOUTH.

### *From the Report of the Committee.*

All who have valuable dairy stock owe it to the agricultural community, at least to exhibit it at our fairs and to make such trials as shall fully test its distinguishing properties. The result of such information would tend to raise the standard of what should constitute a good milch cow. Our aim ought to be to procure the very best. We are satisfied that the hap-hazard purchase from droves is not the way to replenish our dairy stock, although this is the practice in our county to a great extent. If occasionally we should succeed in obtaining a good cow, the calves of such, according to the careless management in these matters, may be good or otherwise; but supposing they should prove well, no confidence can be placed in their perpetuation of good qualities, without a careful selection on both sides, and crossing for a series of years, with a view to particular improvement.

Under such practice we probably should reverse the old proverb, "that a good cow may have a bad calf."

We adopt as the best words we can use upon this subject, the following from the pen of Mr. Goodale, Secretary of the Maine Board of Agriculture. We ask our brother farmers to weigh them well; criticise, reflect, subtract what they may, they will find them more valuable than silver and gold. We wish every farmer in the county would consider them:—

"By long-continued and extensive observation, resulting in the collection of numerous facts, and by the collation of these facts of nature, by scientific research and practical experiments, certain physiological laws have been discovered, and principles of breeding have been deduced and established. It is true that some of these laws are as yet hidden from us, and much regarding them is but imperfectly understood. What we do not know is a deal more than what we do know; but to ignore so much as has been discovered, and is well established, and can be learned by any who care to do so, and to go on regardless of it, would indicate a degree of wisdom in the breeder, on a par with that of a builder who should fasten together wood and iron just as the pieces happened to come to his hand, regardless of the laws of architecture, and expect a convenient house, or a fast-sailing ship to be the result of his labors.

"Is not the usual course of procedure among many farmers, too nearly parallel to the case supposed? Let the ill-favored, chance-bred, mongrel beasts in their barn-yards testify. The truth is, and it is of no use to deny or disguise the fact—the *improvement* of domestic animals is one of the most important, and, to a large extent, one of the most neglected branches of rural economy. The fault is not that farmers do not keep stock enough; oftener they keep more than they can feed to the most profitable point; but the majority neither bestow proper care upon the selection of animals for breeding, nor do they appreciate the dollars and cents difference between such as are profitable and such as are profitless. How many will hesitate to pay a dollar for the services of a good bull when some sort of a calf can be gotten for a "quarter?" and this, too, when one by the good male would be worth a dollar more for veal and ten or twenty dollars more when grown to a cow or an ox. How few refuse to allow to a butcher the cull of his calves and lambs for a few extra shillings, and this when the butcher's difference in shillings would soon, were the best kept and the worst sold, grow into as many dollars and more? How many there are who esteem size to be of more consequence than symmetry or adaptation to the use for which they are kept? How many ever sit down to calculate the difference in money value between an animal which barely pays for keeping, or perhaps not that, and one which pays a profit?

"Let us reckon a little. Suppose a man wishes to buy a cow. Two are offered him, both four years old, and which might probably be serviceable for ten years to come. With the same food and attendance, the first will yield for ten months in the year an average of five quarts per day, and the other for the same term will yield seven quarts and of equal quality. What is the comparative value of each? The difference in yield is six hundred quarts per annum. For the purpose of this calculation we will suppose it worth three cents per quart, amounting to eighteen dollars. Is not the second cow, while she holds out to give it, as good as the first, and three hundred dollars at six per cent. interest besides? If the first just pays for her food and attendance, the second, yielding two-fifths more, pays *forty* *per cent. profit* annually; and yet how many farmers having two such cows for sale would make more than ten, or twenty, or, at most thirty dollars difference in the price? The profit from one is eighteen dollars a year; in ten years, one hundred and eighty dollars, besides the annual accumulations of interest. The profit of the other is nothing. If the seller has need to keep one, would he not be wiser to give away the first than to part with the second for one hundred dollars? Suppose, again, that an acre of grass or a ton of hay cost five dollars, and that for its consumption by a given set of animals the farmer gets a return of five dollars' worth of labor, or meat, or wool, or milk. He is selling his crop at cost, and makes no profit. Suppose by employing other animals, better horses, better cows, oxen, and sheep, he can get ten dollars per ton in return. How much are the latter worth more than the former? Have they not doubled the value of the crops, and increased the value of farming from nothing to one hundred per cent.? Except that the manure is not doubled, and the animals would some day need to be replaced, could he not as well afford to give the price of his farm for one set as to accept the other as a gift?

"Among many, who are, in fact, ignorant of what goes to constitute merit in a breeding animal, there is an inclination to treat as imaginary and unreal, the higher values placed upon well-bred animals over those of mixed origin, unless they are larger and handsomer in proportion to the price demanded. The sums paid for qualities which are not at once apparent to the eye are stigmatized as *fancy prices*. It is not denied that fancy prices are sometimes, perhaps often, paid; for there are probably few who are not willing occasionally to pay for what pleases them, aside from any other merit commensurate to the price. But, on the other hand, it is fully as true that great intrinsic value for breeding purposes may exist in an animal, and make very little show. Such a one may not even look so well to a casual observer, as a grade, or cross-bred animal, which, although quite as valuable to the grazier or butcher, is not, for breeding purposes, worth a tenth part as much.

"Let us suppose two farmers need a bull. They go to seek, and two are offered, both two years old, of similar color, form, and general appearance. One is offered for twenty dollars; for the other a hundred is demanded. Satisfactory evidence is offered that the latter is no better than any or all of its ancestors for many generations back on both sides, or than its kindred; that it is of a pure and distinct breed; that it possesses certain well-known hereditary qualities; that it is suited for a definite purpose; it may be a Shorthorn, justly noted for large size and early maturity; it may be a Devon, of fine color and symmetry, active and hardy; it may be an Ayrshire, esteemed for dairy qualities, or of some other definite breed, whose uses, excellences and deficiencies are all well known. The other is of no breed whatever. The man who bred it had rather confused ideas, so far as he had any, about breeding, and thought to combine all sorts of good qualities in one animal, and so he worked in a little grade Durham, or Hereford, to get size, and a little Ayrshire for milk, and a little Devon for color, and so on, incorporating also a good share of the 'native' element in his stock, because 'it was tough, and some folks thought natives were the best after all.' Among its ancestors and kindred were some good and some not good, some large and some small, some well-favored and fat, some ill-favored and lean, some profitable and some profitless. The animal now offered is a great deal better than the average of them. It looks, for aught they can see, about as well as the one for which five times his price is asked. Perhaps he served forty cows last year, and brought his owner as many quarters, while the other only served five. The question arises, Which is the better bargain?

"After pondering the matter, one buys the low-priced and the other the high-priced one, both being well satisfied in their own minds. What did results show? The low-priced one served that season perhaps a hundred cows; more than ought to have done so, came a second time. Having been overtasked as a yearling, he lacked somewhat of vigor. The calves came of *all sorts*—some good, some poor, a few like the sire, more like the dams—all mongrels, and showing mongrel origin more than he did.. There seemed in many of them a tendency to combine the defects of the grades from which he sprang rather than their good points. In some, the quietness of the Shorthorn seemed to have degenerated into stupidity, and in others the activity of the Devon into nervous viciousness. Take them together, they perhaps paid for rearing, or nearly so. After using him another year, he was killed, having been used long enough. The other, we will say, served that same season a reasonable number—perhaps four to six in a week, or one every day—not more. Few came a second time, and those for no fault of his. The calves bear a striking resemblance to the sire. Some from the better cows, look even better in some points than himself, and few much worse. There is a remarkable uniformity among them; as they grow up they thrive better than those by the low-priced one. They prove better adapted to the use intended. On the whole, they are quite satisfactory, and each pays annually in its growth, labor or milk, a profit over the cost of food and attendance, of five or ten dollars, or more. If worked enough to insure the exercise needful for vigorous health, the bull may be as serviceable and as manageable at eight or ten years old as at two; meantime he has got, perhaps five hundred calves, which in due time become worth ten or twenty dollars each more than those from the other. Which now seems the wisest purchase? Was the higher estimate placed on the well-bred animal based upon 'fancy,' or upon intrinsic value?" EPHRAIM B. THOMPSON, *Chairman.*

## RAISING CALVES.

### HAMPDEN.

*Statement of Milo J. Smith.*

I have tried nearly all methods of raising calves. I raised them formerly by hand, that is, taught them to drink from the pail, when from one to three days old, feeding them on new milk, warm from the cow, from two to four weeks; then changing gradually to skim milk, that is, setting the milk for twelve hours, then skimming, warming and feeding, scalding in some middlings, or oat meal, and so on until the cream was all taken from the milk. We have also tried hay tea, as recommended in some agricultural reports, but without any success whatever, and I must say that I never raised what a good farmer would call a good calf on the hand system. For a time I gave up raising calves, from the fact that I could buy just such herb-tea, skim-milk calves, from six to eight months old, from three dollars fifty cents to five dollars, much less than I could raise them.

I have come to the conclusion that if a calf is worth raising at all, it is worth raising well. My method is to put two good calves to one cow. If at the season of the year that stock is kept at the barn, the calves are kept in a stable by themselves, with a manger convenient for feeding; they are turned to the nurse twice in twenty-four hours, just long enough for them to take the milk clean, which is done in a very few minutes. They are then returned to the stable and fed with plenty of rowen hay, with roots of some kind finely cut, which they soon learn to eat, if placed in the manger. A light feed of shorts or oats is most excellent, and in the absence of roots is absolutely necessary. In the summer season, with plenty of feed, I let the nurse and calves run together in pasture, and have no further trouble with them until they come up to the barn, when, if they are of proper age, which is at least six months, and if older no harm, they may be shut entirely away from the nurse and fed on the best of hay, with a mess of roots, shorts, or oats daily. In this way we never have any stunted calves. In this way there is no standing still or going back three months after weaning, and the calf at one year old is heavier and worth more money than the average of calves raised in the ordinary way are at two years old.

But, says the careful farmer, there are objections to your mode of raising calves: First, they contract a habit of sucking which they never forget. Second, the great cost, keeping cows solely for raising calves would not pay. Third, calves forced along, or bread and buttered up as the saying is, the first year, are like house plants, and when they come to be exposed, or brought to hard fare, they will wilt. They cannot endure starving and banging, like those that are toughened in raising; and have less constitutional strength.

Now I can answer all the objections brought forward, to my own satisfaction at least. In regard to the first objection, I have never had any trouble at all. Shut them apart for some weeks and they are weaned, and I never knew them take to sucking again.

In the second, I admit that it costs more to raise a good calf, or to raise a calf well, than it does to raise one poorly; but who can afford to raise a poor calf? Who can afford to raise a calf six months for four dollars? Yet we can usually buy them at that price. I think the difference in the cost is not so great as is generally estimated, when we take into account the time it takes to feed and care for the calf raised by hand, the value of the milk for the swine, &c.

In regard to the third or last objection, I deny that there is any unnatural forcing in my mode of raising. It is only returning to the first and only natural way of rearing young animals of any kind, and I do believe one quart of milk drawn from the cow by the calf, is worth two fed in any other way. The calf that is fed on nutritious feed, and kept growing from the time it is dropped, so as to make a year's gain at two years old, over the common method of raising, is the animal that has got the constitution. The bone is formed, the muscle developed, the chest expanded, and you have a constitution grown on that animal that will last for generations, whereas the feeble and dwarfed constitution will be found on the animal that has gone through all the stages of toughening in raising.

NORTHAMPTON, November 23, 1863.

### *From the Statement of C. L. Buell.*

I think the best way to manage a kicking cow is, to let two calves do the milking until the owner is ready to dispose of her for other purposes than the dairy.

LUDLOW, October 6, 1863.

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# HORSES.

## MIDDLESEX NORTH.

### *From the Report of the Committee on Draught Horses.*

There is a race of horses found in the State of Vermont, commonly known as the "Vermont Draught Horse." These horses do not belong to any especial breed, but are a mixture of several, the hardy Canadian and heavy Dutch horse appearing most conspicuous in their construction. These horses are most admirably adapted to common draught and farm use; they are commonly about sixteen hands in height, with broad breasts and powerful hind-quarters; they are closely ribbed up and possess good legs and feet. These horses have no match in the world for draught and farming purposes; kind, but not sluggish, powerful, but not slow, they combine the two great essentials of a fine draught horse,—strength and activity.

About the commencement of the present century, a horse owned by Mr. Justin Morgan, of Randolph, Vt., became quite celebrated in that locality as the usual victor in the short races, then so common in that part of the country, in which he frequently engaged. This celebrity has increased and continued till now; so that the rage for Morgan horses, as the descendants of this horse are called, finds its counterpart only in the popular passion of a few years since, for Shanghai chickens, and the more recent one for Jersey cattle. The celebrated horse Ethan Allen is a fine specimen of this class.

An attempt has been made to trace the pedigree of this horse. It proved unsuccessful, however; but in its place a pedigree has been "trumped up." No authentic record exists of the history of this family, farther back than to the horse, before mentioned, owned by Mr. Morgan, the first that attained any especial note; and the statement made by the friends of this horse that he is "thoroughbred," bears the falsehood on the face of it. The abundance of hair in the mane and tail, is a conspicuous proof that he is not "thoroughbred," and confirms us in the belief that he possesses a considerable portion of Canadian blood. This is a marked feature in all Morgan horses. In short, the Morgan family is a class of the Vermont horses, and is finely adapted to the needs of this section of the country —strong, courageous and active, they meet the requirements of every class of people.

We recommend to the farmers of this county a more extensive and general use of horses. They are attentive, quick to learn, and a thing once learned they never forget. Their capacity is greater than that of any other animal, except man, by whom they may, in gentleness, be taught almost any thing. Horses, like children, should be trained, not "broken." No animals in the world better appreciate kindness. The Arabs, while possessing the most spirited of horses, have, by their uniformly kind manner towards them, made them the gentlest and kindest. We, by pursuing a gentle and even course in our treatment of this noble animal, may train him to be our most obedient and useful servant; while for our kindness, he will reward us with his unselfish, devoted and lasting attachment.

HENRY E. WORCESTER, *for the Committee.*

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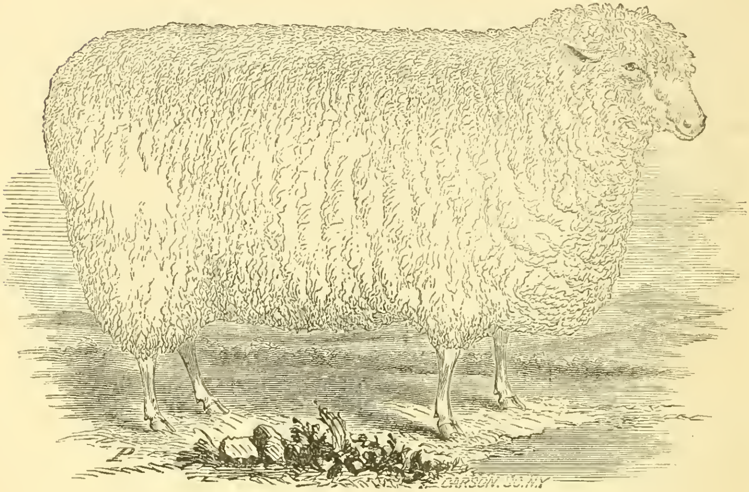
# SHEEP.



Cotswold Ram, "PILGRIM." H. G. White, South Framingham.

## ESSEX.

### *From the Report of the Committee on Coarse-Woolled Sheep.*

The chairman of the committee would state that he has not had an opportunity to consult with the other members in regard to the opinions he expresses; but in the awards, they were united in their views.

We would refer to the able report upon sheep, made last year; and, while we would commend much that is said there, we dissent from many of the views expressed. The report says: "In sheep husbandry, it is evident that wool is the *primary*, and mutton the *secondary* object." We maintain that, in this county, mutton or lamb is the *primary* object, and wool the *secondary* object.

Sheep husbandry, to be successful here, must be managed somewhat in the same way that our market-gardeners manage their business. The first inquiry with them is, What can we grow that cannot be transported from a distance,—for where land is high, it will not pay to raise those articles that will keep,—or that enter largely into the commerce of the world? It matters not to them how cheap potatoes can be grown on the Penobscot, while we have a demand for them here in August, before they can be brought from Maine. So we, if we think of raising sheep, must inquire, not what will keep long, not what can be transported well, but for what is there a demand, in which the farmers of Maine and Vermont cannot compete with us. We answer, early lambs. Every farmer that has ever kept sheep knows that there is nothing that grows upon his farm that he can sell so readily at his own door as his early lambs. We are told in the report that five cents per pound is the price usually paid by the butcher for mutton. We have kept sheep for four years, and the butchers have been willing to pay five dollars apiece for lambs that will weigh thirty pounds in June.

We have been permitted, within a few days, to look over the books of one of the largest dealers in mutton in this county, and we find that the average wholesale price for lamb in June and July was fifteen cents per pound. Perhaps I shall not in future be able to get so much more for my lambs than I shall for my wool, as I have for a few years past. To illustrate my meaning, I will give you the actual sale from one of my sheep for the last three years:—

| | | |
|---|---|---|
| 1861. | Two lambs, dropped the 5th of March, sold the 15th of June to the butcher for $10, | $10 00 |
| | Six pounds of unwashed wool sold at 25 cents per pound, | 1 50 |
| 1862. | Two lambs at $4.20 apiece | 8 40 |
| | Six pounds of unwashed wool, at 40 cents per pound, one-third shrink, | 1 60 |
| 1863. | Two lambs, at $3.60 apiece, | 7 20 |
| | Six pounds of unwashed wool, at 55 cents per pound, | 3 30 |
| | Lambs for three years, | $25 60 |
| | Wool for three years, | $6 40 |

We would not make this case a general rule, but we think that the lambs from a flock of well-kept ewes will sell for twice as much annually as the wool. At present we have not a good market for wool in this county, although a large amount is manufactured here, yet when we have asked the dealers to buy wool, the answer is, we do not wish to buy of the farmers, we prefer to have it in large lots. If more sheep were kept, we should undoubtedly have a better market for wool.

We are aware that it may be said that it requires more care and attention to raise good early lambs than it does to produce wool. This is the kind of farming that we need here. Those that would wish to get along in a slip-shod, hap-hazard way, had better go to Texas and raise wool.

We would again quote from the report:—"That we can feed sheep profitably, there is no doubt, but they must be adapted to our agricultural circumstances." Now, what are our agricultural circumstances? First, we have a good market for lambs, and a poor one for wool.

Second, our pastures are poor in August and September, therefore, we should keep that breed of sheep whose lambs will be fit for market early. If we keep the fine-wool sheep, their lambs are too tender for the severe weather we often have in March; if they do not come till the warm weather, they must be kept with the ewes till autumn.

Thirdly, we can raise roots advantageously here, and those with second-crop hay are what the ewes need to make good early lambs.

In feeding sheep in winter, I have often noticed with what avidity and apparent relish they eat the heads from clover hay. Why is this? Chemists tell us that wool contains a large amount of those elements found in beans, and this is why sheep are so fond of them. Botanists say that clover belongs to the bean family of plants, and must therefore contain more that will produce wool than other hay. I have often noticed that sheep will select the timothy and leave the redtop hay, while the cow will eat the redtop and leave the other.

I would call the attention of those who manage our experimental farm, to trying the experiment of raising beans upon an acre of that plain land, for the purpose of feeding to sheep, without threshing.

We regret that those who exhibited their sheep did not give us a more particular account of their mode of keeping them, and of the income of their flocks.

We would not close this report without calling the attention of farmers to the effect of sheep upon farms. We are satisfied that if they are permitted to roam over the farm in early spring, they do a great injury to the young grass. We have sometimes thought that the manure in winter was not so valuable as that made from the same food given to cows, because sheep should be kept out in the air more than cows, and this exposes it to waste; as to the pasture, some say they injure it by biting too close. We have begun the experiment in trying to reclaim, by sheep, about twenty acres of rough, rocky, bushy pasture. I have noticed that they do not eat the huckleberry bush; but are fond of the berries when they begin to ripen. The blueberry bush they eat much; the sweet-fern they do not eat except very early in spring; the butter-cup they like; the indigo-weed at some seasons they will eat; briars, when young, they eat; the barberry bush, where they can reach, they kill in a short time.

How long it will take to make a very decisive improvement in such a pasture as this, I cannot tell at present; we begun with the expectation that it would require five years of close feeding to effect a very permanent change.

Wm. R. Putnam, *Chairman.*

## WORCESTER NORTH.

### *From the Report of the Committee.*

It seems to be an established fact that the pastures in this vicinity are not as good as they were once. In them bushes and briars more easily take the places of some of the best grasses; they need ploughing oftener and require larger applications of manure to make them hold good, and it is said they need almost constant care and labor to keep them from running out.

As this is a matter in which all farmers are more or less interested, your committee deemed it of sufficient importance to consider what bearing sheep-husbandry had on this subject, and therefore they made the following inquiries of the principal sheep-raisers of their acquaintance:—

1st. Is it better for pasture lands to have sheep kept on them than any other kind of stock?

2d. Do you know from your own experience that sheep will eradicate bushes, or in any way improve the pastures in which they are kept?

The answers which were received to the above questions were prompt and sufficient, and as they contain the views of practical men who have had long experience in the business, your committee are pleased to place them before the society.

Hosea M. Caswell says: "I notice sheep always rest on the highest parts of the pasture, and spend more of the time on the hills than cattle, consequently the manure is more evenly distributed. Sheep also require such a variety of food they will even kill out hardhacks and thistles."

James McIntire says: "There is no stock like sheep to renew old pastures. I know clover to come in and bushes to die out in pastures where they have been kept."

Joel Hayward says: "I am well satisfied that sheep do materially improve pasture lands, not only from my own experience, but from what I have observed of pasture land where they have been kept in this vicinity. I have had sheep for nearly twenty years in one pasture, and am confident that it will keep one-third more and keep them equally well, as when first used for that purpose. I remember an instance near here where a piece of land had become quite thickly covered with a growth of white birch; these were cut close with a scythe and then sheep were turned in, which (perhaps for want of better feed,) kept the young shoots fed down and cleared the pasture of brush."

Mr. Hayward does not believe in compelling sheep to become "bush exterminators," but says "give them clover and other sweet grasses, give them as good as you have, and if you have used proper judgment in the selection of your flock, you are well insured of a good profit."

George Fox says: "I believe in a mixed stock for a pasture; used to think it would not do to have sheep and cattle go together, but now I am satisfied both will do better, provided you give them plenty of feed. It is cruel and unprofitable to keep sheep so short as to compel them to eat bushes," but he adds, "there is scarcely a bush or plant, (except a few poisons,) which sheep do not love to eat. I have many times seen sheep turn from white clover, they like so well, to brakes and bushes. My idea of sheep raising is this: A few graded kinds of sheep, with as wide a range of pasture as possible, and let the sheep be kept well enough to raise twin lambs which will weigh 100 pounds each."

William G. Wyman says: "You ask for my 'views, experience and observation' in sheep husbandry, in reference to the effect upon pasture lands of keeping sheep upon them, as compared with that of other stock; whether they 'will keep down bushes, or in any way improve the pasture in which they are kept?'

"In reply, permit me to say that while I do not think all pastures would be improved by keeping sheep upon them, or that pastures generally would be benefited by sheep to the exclusion of all other stock, my own experience and observation lead me to believe that most of the pastures in our county, and in the vicinity, would be greatly enriched, their productiveness largely increased, and their real value enhanced, if sheep were fed in them in very much larger numbers than they now are, either in immediate connection with horned cattle and horses, or by occupying the pastures alternately with other cattle.

"The effect upon bushes is very quickly observed. In my own pasture, bushes which cows, oxen and horses would not 'keep down,' have been entirely eradicated by sheep; when once cut down the sheep eagerly nip the fresh leaves and tender shoots of almost all bushes, shrubs and weeds, as fast as they appear, and thus prevent their full development, so that they soon die from sheer exhaustion, and give place to the finer grasses. I find that my sheep relish many plants which other stock will not eat, so that if kept with other stock a pasture will afford sufficient nourishment for more animals, in number and weight, than it would of cows or horses alone. In other words, two pastures will support more cows and sheep, if they are permitted to feed together, or in each pasture in alternate weeks or months, than if the sheep were confined to one pasture and the cows to the other, through the entire season.

But the greatest benefit which our worn-out pastures derive from sheep, is from their droppings. And in this connection, perhaps, I may be permitted to allude to the peculiar structure of the sheep's foot, and to some of his habits, which, in my opinion, induce an extensive, and more equal distribution of this valuable fertilizer than of that from any other animal, and which also leads to the deposition of the largest quantity of it just where it is most needed.

"The delicate and sensitive arrangements of the internal portion of the sheep's foot are protected by a hard, horny substance, somewhat resembling the nail on one's fingers, which extends in a thin layer around the outside of each division of the foot, past the toe and turning inward nearly half way to the heel. This nail-like substance, in its natural condition, is worn down nearly even with the bottom of the hoof, and presents an impervious outside coating for the foot and a firm, blunt edge for it to rest upon. But this horny substance or edge is constantly growing, as the thumb nail grows, and if the growth is not removed, will project below, and usually turn under the rest of the foot, causing great inconvenience in locomotion, and serving as a receptacle for earth, gravel or filth which is uncomfortable and unhealthy, and liable to work through openings that may be formed within the hoof to the more sensitive portions, producing ulcers, or other sores which ultimately lead to the dreadful disease known as 'foot-rot'; or the edges may be broken off irregularly to the quick, as one's nails are sometimes broken to the tender flesh, producing similar sores and tending to the same result.

"I have known a sheep, when confined in narrow limits, on straw bedding, and the feet neglected, to have a growth of nearly an inch in length, of this substance, in a single winter, which almost 'upset her understanding.'

"When confined in soft, marshy pastures, or in rich, fertile pastures which are very smooth and free from stones, there is little opportunity for sheep to keep their hoofs worn down to the natural condition, and if not regularly trimmed or pared by hand, inflammation, ulcers and foot-rot frequently follow as a natural consequence. Such pastures, therefore, being unsuitable for sheep, will not be improved by them, unless the sheep are fed upon them only a few days at a time, while they have access to a more congenial range most of the season.

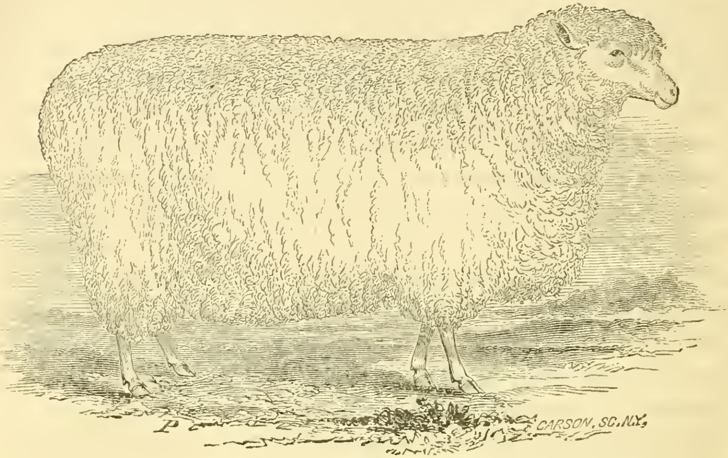
"Our rough, rocky, hilly pastures, on the contrary, afford the most natural and agreeable summer feeding places for most kinds of sheep, and here their naturally active and playful habits lead them to skip about from rock to rock, upon every knoll, through every hollow, prying into every nook and corner, scattering fertility wherever they go, while the natural inclination to keep their feet clean, bright and well-scoured, leads them to shun, as permanent stopping-places, all wet, swampy, or marshy spots, and to seek for repose only in the highest and dryest parts of the pasture ; hence they almost invariably congregate during the heat of the day and at night on the least fertile portions, naturally, of the lot, where the subsoil is most porous, and the ground hardest on the surface, whence their droppings wash down in all directions, bringing in new grasses, and giving an appearance of fertility even to what were previously almost barren, sandy or gravelly knolls.

"Pastures of this description, therefore, may be very greatly improved by being stocked in part or wholly with sheep, and the more the pastures have been previously exhausted, or 'run out' with other stock, the more immediate and the more apparent the improvement.

"My advice to farmers who keep sheep on soft, moist lands, or on rich, smooth pastures free from stones, would be to examine their feet frequently and pare the outer edge of the hoof carefully, and so often as to keep it nearly even with the bottom of middle, by taking off only a little at a time. Similar advice will apply to those who keep their sheep enclosed, and constantly bedded during the winter ; while with a wide range and stony pastures in summer they will take care of their own feet, and very rarely be troubled with foot-rot or any other disease of the foot."

We find these practical and intelligent men agree that sheep are better for a pasture than any other kind of stock. But Mr. Fox, of New Ipswich, and Mr. Wyman, of Fitchburg, advise keeping sheep and cattle together in the pasture. One reason is they can keep more stock in this way, as the sheep will eat grasses, plants and bushes which the cattle refuse. Another reason is, the sheep will have a wider range of pasture, and thus gratify its strong love for a great variety of food, and perhaps another and more important reason, is, that the sheep by its habit of continually cropping the tender shoots of brakes, and bushes (even where the best grasses are abundant,) must exhaust and eradicate them.

"We cannot afford to keep sheep just for their wool," says one sheep-raiser, and this idea seemed to be fully carried out at the fair, as none but the larger and hardier breeds of sheep, viz.: The South Downs, Cotswold, Leicester, and native, which furnish the best mutton were represented there. The farmers in this vicinity show good judgment in selecting their breeds of sheep, because they not only furnish more and better mutton than other breeds, but the wool which they produce can be sold at comparatively better prices than formerly. There is a demand for these combing wools which must increase for years, as new machinery, involving a large amount of capital, is being put in operation for the purpose of manufacturing these long combing wools, the production of just the breeds of sheep exhibited at the fair. Now it would be folly to doubt of our success in the manufacture of worsted goods, and to show how great a demand there may be for the manufactured articles, we quote from a writer in the *United States Economist*, who says: "We imported into this country last year $17,367,672 of worsted and cotton, and worsted fabrics;" and urges us to produce the wool. The manufacturers are doing their part in



Cotswold Ewe, "LADY GAY." H. G. White, South Framingham.

introducing the machinery necessary for its manufacture, and it only remains for the farmer to supply the raw material, (and a vast quantity it will take,) and thus save this needless expenditure of money for foreign goods.

The committee feel under obligation to Messrs. Fox, of New Ipswich, and White, of South Framingham, for the interest they so generously gave to this department of the exhibition.

### HAMPDEN.

#### *Statement of C. L. Buell.*

The twenty ewes I present are crosses of the South Down and native. Several of them, recently slaughtered at sixteen years of age, were until the last year of their lives the most profitable sheep in the flock. One year they produced two sets of lambs, which with their wool averaged ten dollars per head. From November, 1862, to March last, the flock had four quarts of corn per day, with all the swale hay they wanted. This hay was worth only five dollars per ton, and they would pick out about half of it, the remainder being used for litter. After the first of March the corn was withheld and they were fed on rowen and English hay. They commenced lambing about the middle of March. Lost some on account of cold weather, but saved twenty-six, which sold for four dollars a head. Their fleeces averaged three and one-fourth pounds, which were sold at shearing time for sixty-two cents. They were turned to pasture the middle of May, having consumed during the winter half of two tons of swale hay worth five dollars, sixteen bushels of corn worth sixteen dollars, and one and a half tons of good hay worth eighteen dollars. The pasturing for twenty-two weeks in summer I estimate at fifteen dollars, which is a liberal estimate considering the advantage to the soil, their manure not evaporating like the droppings of cattle and horses. The total cost therefore for one year I call fifty-four dollars. My receipts were twenty-six lambs at four dollars each, one hundred and four dollars; sixty-five pounds wool at sixty-two cents per pound, forty dollars and thirty cents. Total, one hundred forty-four dollars and thirty cents. Profit, ninety dollars and thirty cents. The flock is in better condition than it was a year ago.

LUDLOW, October 6, 1863.

## PLYMOUTH.

### *From the Report of the Committee.*

A few years since sheep were not exhibited at the exhibitions of this society, and sheep husbandry had become almost unknown. A few sheep were kept in remote corners of the county, mostly known as native sheep, with long legs, and narrow breasts, wool of all varieties on the same carcass, except the finer grades, with straight hair protruding from the more substantial level of the woolly matting. These sheep could run almost like deer, and jump or climb a four-rail fence. The majority of our farmers had been brought up with the idea that stone walls and common fences would not restrain sheep, and they judged rightly of such as were known to them. We have now among us many flocks small in number, which are easily confined by a good wall, or a three-foot fence, close enough to prevent their crawling through. Sheep raised for mutton, as in England—and it is for mutton principally that they must, in a series of years, be raised here—sheep raised and kept for mutton chiefly, are quiet, and lazy.

We must learn that sheep husbandry does not consist in grazing all summer and fall over barren hills, and starving all winter on salt hay, and over-ripe dried meadow grass; and then we shall abandon the idea that we cannot keep sheep for want of fences. Few English farms are so poorly cultivated as ours, and very few that do not carry sheep. And therefore we find the imported sheep generally shorter-legged, fuller-breasted, more inclined to fat, more thrifty, though perhaps subject to more diseases incident to soil and climate, than here; and therefore, also, they will degenerate here, if we farmers do not abandon the old notion that sheep will live anywhere, and on any thing. We would not advise a farmer to purchase a sheep of English blood, if he expects that he is to improve his stock without care on his part. His lambs may be improved, we doubt not, by any infusion of strong, new, or healthy blood; but his improved flock will degenerate, without the care and the food which are always the conditions of good stock raising.

We labor under the idea that if we have a Leicester buck or a South Down, an Ayrshire bull or a Jersey, a Morgan stallion or a thoroughbred, that all the rest follows.

We would not discourage the use of the best animals, and the purest bloods. That man is "penny wise and pound foolish" who does not use them. But he is equally so if he does not only see (what is so apparent,) but act on the idea, that food, culture, care are requisite. Better the farming, the stock is bettered; enrich the land, and the stock is enriched; confine your labors to few fields well cultivated, and the cares of your stock are diminished, and their beauty and thrift increased. Good blood in a horse always tells. There is little degeneracy. Why? Because no animal is generally better cared for than the horse. CHARLES G. DAVIS, *Chairman.*

# THE DAIRY.

## WORCESTER NORTH.

*From the Report of the Committee on Bread and Butter.*

The most essential things in butter making, after producing the milk, are undoubtedly the following: 1st, getting *all* the cream; 2d, having it in a good condition for churning; 3d, making a complete separation of the butter from the buttermilk; 4th, preserving the butter, when to be kept for a considerable time, in such a manner as to retain its original sweetness and good flavor.

In regard to the first point, there are three things which are essential: good light, a free circulation of air, and a proper temperature. There are a very few who have not learned to avoid close, dark cellars, in which to set milk for butter; but if the milk room be above ground, the milk, during the hot season, will often become so soon curdled as to prevent the rising of a portion of the cream. If the dairy room has a northern or northwestern exposure, with a room over it, between it and the roof, this will be less likely to occur. This trouble is remedied in some of the best dairies of a neighboring State by constructing the milk room partially underground, admitting air and light through latticed windows near the top. A free circulation of air under the pans, is secured by placing them on a framework of horizontal bars, instead of board shelves. The proper degree of coolness in warm weather, is imparted to the milk by some skilful dairymen, by setting the pans into shallow troughs, into which a stream of aqueduct water may be made to run at pleasure. In this connection it may not be out of place to call attention to a new milk-pan, invented and exhibited at the late fair, by J. F. Monroe & Co. This invention combines the means of a very perfect circulation of air and an insulation, by which the milk is no more liable to sour during a thunder-storm or the sultry weather attending it—so the inventors claim—than at any other time. The pan differs from the common tin milk-pan, in having short glass legs, or buttons, fixed to the bottom, which, being non-conductors of electricity, perfectly insulate it, thus preventing souring of the milk by electrical currents. The circulation of the air through the centre of the pan is secured by an upright funnel from the bottom. It is simple, not expensive, and appears to be a valuable invention; at any rate worthy of notice and trial.

Experiments conclusively show that milk, to be perfectly creamed, should not be more than three inches in depth. The time required for the cream to rise depends upon the temperature of the room. At 50°, it will rise in 36 hours; at 55°, in 24 hours; at 58°, in from 12 to 16 hours. *The condition of the cream*, after being taken from the milk, is a matter of importance. Cream that is allowed to become sour, will make a better article of butter than that which is fresh. It being in this condition will also facilitate the operation of churning. Butter made from sweet cream is neither great in quantity nor superior in quality. The cream when allowed to stand for some days before churning, should be frequently stirred to prevent curdling. In regard to the temperature of the cream when in the churn, it must be at 62° before the butter will come; but it is better to raise it from about 55° by agitation in the churn, than to have it higher when put in,—otherwise a soft, white article will be produced.

It is hardly necessary, perhaps, to remind any one that cream or butter becomes very easily tainted; so that the air of the dairy room should be frequently renewed, and rendered free from unpleasant odors. The standard of neatness for the same can hardly be too high. A practical observer on this subject says: "Cleanliness may, indeed, be regarded as the chief requisite in the manufacture of good butter. Both milk and cream are so exceedingly sensitive to the air, in everything with which they come in contact, as to impart the unmistakable evidence of any negligence in the taste and flavor of the butter."

The third requisite for the production of good butter, is a proper separation of the same from the milk and curd mixed with it when churned. Over-churning is not advisable for aiding in this, for, although it may facilitate the process, and slightly increase the quantity of butter, it diminishes that fine, waxy, yellowish appearance so agreeable to the eye. There are two methods in practice for effecting the above; one by washing the butter with cold water so long as it runs off white; the other by "working it over." By the former it can be kept longer fresh; by the latter a higher and more agreeable flavor is retained. The best way generally is to knead thoroughly with a butter-worker, and dry with a large sponge and dry cloths.

In the preservation of this article, great care should be exercised. There are two substances which are changed in rancid butter,—the fatty matters and milk sugar; the two agents by which this is effected, casiene, or curd, mixed with the butter, and the oxygen of the atmosphere. This fact, then, establishes the importance of entire freedom from the former and exclusion from the latter. If the salting be seasonably done it arrests or greatly retards the change which any curd which may remain, would otherwise produce. Great care should be taken that the packing be done in vessels perfectly tight, pressing the butter as solid as possible, covering it with a brine. Butter dealers prefer wooden tubs or firkins for keeping, to stone ware, and of the former none is better than oak.

Good butter depends more upon the manufacture than upon all other things put together. A judicious writer upon this subject remarks: "In every district where good butter is made it is universally attributed to the richness of the pastures; though it is a well-known fact that, take a skilful dairy-maid from that district into another, where good butter is not usually made, and where, of course, the pastures are not deemed favorable, she will make as good butter as she used to do.

If the public wish for superior butter, (and who does not?) they must be willing to make a greater discrimination than heretofore, between the prices of what they seek for, and that which is positively bad. So long as an inferior article brings about the same price as that which is extra, people must expect that they will sometimes be unable to find what they want in the market. We hear of a man who has received forty cents per pound for all of his butter the present season, at a well-known public house in Boston. His herd of cows consists partly of the Jersey stock. May there be more such butter makers and more such customers.

L. W. RUSSELL, *Chairman.*

## HAMPSHIRE, FRANKLIN AND HAMPDEN.

### *From the Report on Milch Cows.*

In regard to the manufacture of butter, all good dairymen will admit that perfect cleanliness in all things relating to the milk in all stages is highly important.

One step towards securing this result is to have a proper stall for feeding and milking, and in which the cow will sleep in the colder months. We have never seen one just what it should be, and are not prepared to go fully into the details in regard to the construction. We may say, however, that the floor should be so laid that the planks shall be in a position transverse to the stall. They may be laid at a gentle slope, so as to convey the urine into a receptacle prepared for the purpose. Upon this a platform should be raised six inches in height, upon which the cow is to feed and lie. The width of the stall for a large cow, say three feet, enough to give room to milk and no more—not enough to allow her to stand quartering. The length of the platform a trifle less than the trunk, for a large cow, say five feet.

The feeding manger may be so arranged that she cannot get far enough forward to allow the droppings to fall upon the platform. The manger to be so arranged that the animal will rest with comfort at night. It is essential that she should be tied inside the manger, with her head over it, care being taken that it be made low enough on the side next her (say fourteen inches,) to secure that result. A stall of this description has kept a cow dry and clean, in good condition, and with a large flow of milk. There is one inconvenience about it, in that it is adapted to cows of one length only. If it is wanted for one of a different size, then an alteration of the length of the platform becomes necessary. Perhaps it might be so arranged that the platform plank should pass under the manger, being made moveable, but properly secured. We leave the suggestion for wiser heads to consider.

NORMAN T. LEONARD, *Chairman.*

# BEE CULTURE.

## ESSEX.

*From the Report of the Committee on Bread and Honey.*

We think, were a proper interest awakened on this subject, our county might exhibit a large amount of honey. We might keep bees enough to visit every flower in the county, so that nothing which contains honey should be allowed "to waste its sweetness on the desert air." There are probably not so many bee-keepers in this county as there were twenty-five years ago; and we may here inquire what has produced this falling off. The principal reason given by those who have abandoned the business is, the depredation of the moth; and this is true not only of this vicinity, but of all the Northern States. Those who have kept bees, say to us, "Yes, we used to keep bees, but the moth destroyed one swarm after another, till they were all gone; and as we knew no remedy, we thought it was useless to try again." And besides, our bees did not swarm as they did some years ago; and this, so far as our experience goes, and from all we can learn from others, is true.

We know some who have kept bees ten or twelve years, and have had no swarms. Whether this is the result of taking honey from the hive in boxes, we cannot say; but we can say that during fifteen years' trial we have never had a natural swarm from a hive from which we took honey in boxes. We have sometimes inverted the boxes in the spring, with a determination to get a swarm instead of honey—but the result is the same. The bees, after filling the body of the hive, have clustered on the outside, and neglected to swarm. And here we would remark that, although most writers on bees say that clustering or hanging out is a symptom of swarming, our experience is that it is directly the opposite; for if a hive contains bees enough to throw out a swarm, if they get the habit of hanging out, it indicates that, for some reason unknown to us, they choose to live out of doors in warm weather, and thus reduce the temperature of the hive, so as to enable them to stick to the old home. But this non-swarming propensity now presents no objection to bee-keeping, or its increase, as we shall hereafter show. Another objection is, something, we know not what, is the matter with the hive—our bees neither swarm or make honey, and here is a case in point: We had during the past season two hives exactly alike in size, shape and color, standing side by side; we judged one to be a little stronger than the other; during the month of June, any pleasant day, bees enough for a swarm were hanging from the front of the strongest hive, and in that hive no honey was put in the boxes; in the other, the bees "from rise of morn till set of sun," with their merry buzz were filling the boxes with honey.

We are satisfied from experiments that, in this case, all they needed was to stir them up by artificial swarming. One gentleman, who is troubled in this way, says he is determined to go back to the "old box-hive," and apply sulphur to a part of his bees every year, as his father did. But this is like burning the barn to get rid of the rats. Intelligent bee-keepers have argued for many years that bee-keeping could not be brought to perfection till a hive was invented, which would enable the bee-keeper to have control over the bees and combs, and take them from and return them to the hive at his pleasure. Huber (who has thrown more light on the physiology and habits of the bee than all other writers,) saw the necessity for such a hive, and he made some advance towards it by constructing a hive with frames fastened together at the back, so as to open and shut like the leaves of a book. But this hive never came into general use, because it was too complicated for the majority of bee-keepers; and thus for the want of a control over the interior of the hive, bee-keeping has been abandoned by many persons for various reasons, but by far the larger number on account of the moth.

The moth has been the enemy of the bee for more than one thousand years. Aristotle, Virgil, Columella and other ancient writers, mention its depredations. It is about sixty years since it first attacked the bee on this continent; it showed itself in the eastern part of Massachusetts in the year 1800; in 1805 it was in Connecticut.

In 1812 it first appeared in Pennsylvania; in 1830 it reached Cincinnati; some twelve or fifteen years later it arrived on the Mississippi. And thus, like civilization, cholera and the potatoe disease, it has taken its way westward. How it was brought to this country no one knows, but for a time wherever it appeared it nearly destroyed the bees. At first it was more fatal than it has been since, as the bees were taken completely by surprise, and were totally unprepared to resist; but as with men so with bees, "new occasions teach new duties;" after recovering from the first panic, the bees set about fortifying their positions, and have ever since taken such precautions as, with the assistance of their owners, have enabled them in some measure to overcome the evil. If a swarm was reasonably strong, they might prosper; but woe to those who had lost their queen, or from some other cause became reduced in numbers; the moth entered the hive, commenced its work, and the bees after a few days of contest, gave up in despair. Instead of flying from the hive with a merry song in pursuit of honey, they crawl sluggishly around the entrance as though some great calamity had overtaken them. Day after day they appear less in numbers, and soon they all disappear. Upon opening the hive, instead of finding the beauty, order and regularity described by Shakespeare, we find ruin, desolation, worms and filth.

Huber and Bevan both remark that the moth is more likely to attack old swarms than new; but we have had more damage done to new swarms than old ones by this pest. A few years since we put a good swarm in a hive, and examined them every day, as should always be the case. In about ten days, discovering indications of the moth, we immediately opened the hive at the bottom, and destroyed a number of worms; by doing this every morning for a week we succeeded in getting rid of them, and the hive has ever since been prosperous, and we believe they could be exterminated in this way. But by using the hive which we shall describe hereafter, the bee-keeper need have no fears of the moth.

As we remarked previously, the neglect to swarm offers no objection to bee-keeping, for we can now multiply our swarms indefinitely, whether the bees are inclined to swarm or not, and although it is a pleasant sight to the bee-keeper to stand by a hive and see the bees crowding out to swarm, and filling the air with their merry gambols, yet we are satisfied that to increase our swarms permanently we must resort to artificial swarming; for if we depend on our natural swarms, unless we watch the hives during the swarming season, we shall lose a large portion of our swarms; for the time occupied by the swarm in leaving the hive and clustering, rarely occupies more than ten minutes; sometimes not half as long. Sometimes they leave the hive and fly some distance, and after they have gone or have clustered, there is nothing like an even chance of our knowing they have swarmed, even if we examine the hives; and for this reason, among others, bee-keepers for more than fifty years have experimented on artificial swarming.

Till within a short time the process has been so complicated that it required more time and knowledge than the mass of bee-keepers had at their command. But, thanks to the genius and experiments of Rev. L. L. Langstroth (who formerly resided in our county,) the process is now so short and simple that any person keeping bees can accomplish it. Perhaps a relation of our own experience in this matter will here be in place. In 1861 we had a swarm which was hived in 1855, (a second swarm;) during the six years it had filled the body of the hive, but had furnished us with neither swarms nor honey. Having studied Langstroth's method, we invited a friend early in June to come and assist us in the "kill or cure" process. He gladly complied with the invitation, as he had a hive in about the same condition, but he did not believe we could succeed in making a swarm.

On a warm day, about eleven o'clock, when the bees were flying thick, we took the hive from the stand, carried it about twenty feet back and turned it bottom up, having previously stopped the entrance. We then placed a similar hive (empty) on the stand in its place, that the bees which were abroad might enter it. We then opened the bottom of the inverted hive, no bees flying out, as they were completely stupefied with fear; we placed a box the size of the hive on it, and tied a cloth around the joint to prevent any bees from getting out. We then drummed with sticks on the sides of the hive; after a few minutes' drumming the bees commenced going up, and when we thought we had enough for a swarm—having a glass in the box covered with a slide—we removed the box, the bees clustering in the top like a natural swarm. We then, having a sheet upon the ground, struck the box down upon the sheet, emptying the box entirely, and then sprinkled the bees with water from a watering-pot, to prevent their flying. Then placing a hive for them as for a natural swarm, we moved the old hive back to its place on the stand, so that any stray bees might enter it. Shaking the bees from the decoy hive, which we had placed temporarily on the stand, all the returning bees entered the old hive, none leaving. When the driven swarm had entered the new hive, which they did very kindly—it contained no comb or any thing to entice them—we moved the old hive about thirty feet, and placed the new swarm where the old one had stood, and the process was complete, having occupied about forty minutes. So well satisfied was our incredulous friend, that he concluded to operate on his hive the next day if we would assist him. Now for the result. The new swarm went to work immediately, and in twelve days filled the hive, holding one bushel, and the same season gave us twenty pounds of nice honey. The next season they threw off a very large swarm, the 25th day of May, and two afterwards that season.

The old swarm, after recovering from their depression occasioned by the loss of their queen, raised a new queen, became as populous as before, and made thirty pounds of honey for our use that season. I dreaded the operation previous to doing it, as I had never seen any thing of the kind, but it was very easy and a complete success. I have since done it alone several times, and it has always worked well; but I would advise every one who undertakes it for the first time to have assistance. This is certainly an easy method of making swarms; but easy as it is there is a way to do it much easier, and that is by using the movable comb hive, invented and patented by Rev. L. L. Langstroth. In this hive all the comb is built in movable frames, which are suspended from the upper part of the hive, and can be taken out and replaced with the utmost facility. Every one acquainted with bees knows that, if left to themselves, they build their combs in a very irregular manner; but in this hive the combs are built with perfect regularity. We can have them made of any thickness, but it is best to have them all of one thickness, so that we may change them from one hive to another. Thus, if we find in the month of November that one swarm has not honey enough to carry them through the winter, we can take two or three frames from a hive that has a surplus and put them in the weak hive in place of their empty frames. If we wish to make a swarm at the proper season, we take a few frames containing brood comb with the bees adhering, and put them in a new hive; and if we wish for more bees, shake a few from other frames, and we have a new swarm, as bees will never leave brood comb. They immediately raise a queen and go on with their work. To mention all the advantages of this hive would require considerable space; we think any bee-keeper examining it will be convinced that it is *the* hive. Langstroth, in his very valuable book, the "Hive and Honey Bee," gives sixty-one reasons why he considers his hive an improvement on the old-fashioned hive; among them is his facility for getting rid of the moth. All we have to do when we find indications of this pest is to open the hive, take out the frames till we find the interloper, cut out all the comb infected, return the comb to the hive, and the work is done. But we need not enlarge our remarks on this hive; any intelligent person can see at once the advantages of a perfect control of the combs. There are other hives with movable frames, but they are all modifications of Langstroth; to him we believe belongs the invention of the movable comb hive, although about the same time, a Prussian clergyman of the name of Dzierzon invented a movable comb hive, yet not as simple as Langstroth's; neither had any knowledge of the other. To show the estimation in which Dzierzon's system is held in Germany, we give an extract from the Leipsic Illustrated Almanac, Report on Agriculture, 1846:—

"Bee culture is no longer regarded as of any importance in rural economy."

From the same, 1853:—

"Since Dzierzon's system has been made known, an entire revolution in bee culture has been produced; a new era has been created for it, and bee-keepers are turning their attention to it with renewed zeal."

Many persons will be surprised to hear us talk of controlling and handling bees, but to us they possess no terror; by Langstroth's method they seem to lose all desire to sting. It is simply this: When you wish to perform any operation on bees, open your hive, (his hive opens at the top,) and sprinkle them with water made very sweet with sugar or honey; as the bee can never resist the inclination to take any thing sweet, any more than the drinker can his dram, they forget their anger and fill themselves with sweets, and this puts them in so comfortable a frame of mind, that they allow themselves to be handled without resenting it, if you do not hurt them. Bee-keepers have always known that bees were not inclined to sting when swarming, but no one knew why. Langstroth discovered that it is because the bees have taken in a supply of honey to commence work in the new home. Every one knows that a quarrelsome man is better natured after dinner than before; so with the bees, when gorged with honey, they have an amiable disposition. But a new kind of bee has lately been introduced, said to be much more docile, under any circumstances than the common bee; and this is the Italian bee. Aristotle and Virgil both speak of this bee, but it has been comparatively unknown till within a few years. After a lapse of two thousand years, it is receiving considerable attention both in this country and in Europe. It is claimed that the Italian queen retains her fertility much longer than the common queen, and is more prolific; that the Italians are more industrious than the common bee, produce more swarms and more honey, commence earlier in the spring, and work later in the season than the common bee; they are undoubtedly an improvement, but the price at which they are sold has deterred many from obtaining them. The price for an Italian queen has been ten dollars. As the Irishman said, "too much money for so little meat;" but probably before many years the price will be so reduced as to bring them within the reach of all bee-keepers. There are many more points in bee-keeping upon which we might touch, but we have already occupied more space than we intended.

In conclusion, we would advise every bee-keeper to purchase a copy of Langstroth's book, (third edition,) whether they use his hive or not; we are satisfied it will be money well invested. Huber, Bevan and other Europeans have written good books, but they are not exactly fitted to this continent. Many books on the bee have been published in this country, some of them good, many of them worthless. One copies Bevan's preface entirely without giving credit; the sole object of some seem to be, to abuse and villify Huber long after he occupies his grave. Langstroth goes forward in his work, turning neither to the right nor left, and our opinion is that any person studying his book, and managing his bees by its teachings, must *succeed;* and as we think all the objections which have existed against keeping bees can be overcome by the improved methods of management, and the prices of all saccharine matter will probably rule high for many years to come, we hope to see an interest awakened on this subject, which will result in stocking our county with merry buzzing swarms, to such an extent that we shall furnish our own honey, and that too in goodly quantity. Considerable honey is now brought from New Hampshire and sold in this vicinity, large quantities of West India honey are also used here; yet it would not materially interfere with the other duties of the citizens of our county to keep bees enough on our own territory, so that every year we might have a large margin for exporting. Although nature has not given the cane, or any other plant producing sugar in large quantities, yet,

> " God gives man reason, he is taught
> To make the strength of beasts his own,
> Their several qualities are brought
> Into his service."

And we can take advantage of this in the management of bees; and then, too, it is really a pleasure, to an inquiring mind, to study the habits of this little wonder, so busy (if the conditions are right,) during its short season for labor—for the length of the life of the worker bee is about six months, never reaching one year. The life of the male or drone is about four months, while the queen, " sole monarch of the hive," reaches the age of four, and, in extreme cases, five or six years. We can at any time find amusement and recreation going among our hives on a warm day, when the bees are busy, listening to their merry songs, and watching their gyral gambols; for although provided with a sting they never use it except in self-defence, and we are satisfied if their habits were better understood, future committees on bread and honey would have not only a more pleasant but a more onerous duty to perform.

EDMUND SMITH, *Chairman.*

# FARM ACCOUNTS.

## PLYMOUTH.

*An Essay by John H. Bourne.*

The importance of keeping an account of the income and expenses of the farm, has not been fully estimated by the majority of farmers. If they have dealings with their neighbors, they keep some record of it, but they cannot tell how the account stands with their farm. They do not know whether there is more profit in raising hay or corn, or whether any crop pays.

It is not always advisable to take note of the expenses of every field, yet it is often well to see what it costs to raise a crop of grain, roots, &c., in order to judge of the comparative value of each.

Some farmers are deterred from keeping a record of their receipts and expenditures, from the belief that it is too complicated for them; others, that it will take too much time; a few, because of their unwillingness to attend to any intellectual labor; and others still, because they do not feel its importance.

It is important for all, and practicable for every one, that can write and is acquainted with the fundamental rules of arithmetic. No man should consider that he has reached that degree of perfection which entitles him to take rank with number one farmers, unless he keeps accurate accounts with his farm; and one of the best means to be used to reach the front ranks, is to commence and continue to keep a well-arranged, simple and accurate system of farm accounts.

It must be admitted that it is more difficult to arrive at the *exact* cost of a certain crop or animal, than for the merchant to get at the cost of his articles; for instance, in raising a calf, it would take a great deal of time to keep an account of every quart of milk, every pound of hay, every ear of corn, pint of meal or bushel of roots consumed, together with every hour of time employed in feeding, watering and otherwise tending it, until it reached maturity. In such cases an approximation can be reached, near enough for all practical purposes.

Sometimes we see accounts, even in agricultural reports, in which everything a farmer raises is set down at the market value; for instance, the number of tons of hay, the number of bushels of corn and potatoes, and everything that is raised, without a corresponding debit of what is used in keeping the stock through the year; making it appear as if the net income was very large, when, in reality, nearly all is used upon the place.

The plan which I propose to present, is one which I have, in part followed for some years, and has answered every purpose. It is so simple that a person whose education is very limited can adopt it.

Purchase a blank book of about two hundred pages, ruled as common writing paper, or, if desired, with the addition of one line up and down, each side of the page. Let the book be paged, writing the numbers plainly, and place an index at the commencement. Following, should be an inventory of the value of the farm, the stock and farming implements, leaving a few blank leaves for inventories in future years. Next may follow what may be called a memorandum or journal in which should be noted all transactions which are important enough to be remembered. This will require no debit or credit, but is simply a history, important for reference, and will serve to prove the times and nature of any transaction. Near the middle should commence the cash book or farm account, in which every sale is credited to the farm, and every expense is debited. In this account should be the grocer's and butcher's bills, and all expense for boarding every one required to conduct the farm.

Commencing with the last quarter of the book, may be kept the account with different fields, hired men and every person with whom an account is kept.

As the season begins in April, I would commence the year with that month, as less produce is on hand and it is easier to take an inventory, or an account of stock, as merchants call it, which should always be done. It will require some judgment to rightly estimate how much, more or less, each animal is worth than one year before; whether your buildings and fences are in as good repair; whether your land has improved or lessened in value; whether the new tools purchased are equal in value to the loss, by use, of the old; whether you have more hay, grain or vegetables on hand than at the commencement of the previous year, all of which should be correctly ascertained, being appraised at the market value. If an inventory is not taken, however accurate the account of the receipts and expenditures may have been, the real income or loss of the farm will not be known.

The following will assist in understanding the plan to be pursued:—

*Inventory of my Farm, Stock, Tools, &c., April* 1, 1862.

| | |
|---|---|
| Farm, of about one hundred acres, upland and meadow, in a poor state of cultivation, with a house, two small barns, and other outbuildings, which would probably bring at auction, | $2,500 00 |
| 1 horse, | 80 00 |
| 4 oxen, | 180 00 |
| 4 cows, | 160 00 |
| 2 calves, | 14 00 |
| 2 steers, | 50 00 |
| 2 yearling heifers, | 25 00 |
| 1 heifer, | 20 00 |
| 33 hens, | 11 00 |
| 3 hogs, | 31 00 |
| 1 express and 1 riding wagon, | 120 00 |
| 1 ox wagon and ox cart, | 60 00 |
| 1 good and 1 poor harness, | 36 00 |
| truck harness and yokes, | 18 00 |
| 2 ploughs and cultivator, | 20 00 |
| ox sled and chains, | 8 00 |

| | | |
|---|---|---|
| | spades, shovels and forks, | $10 00 |
| | corn sheller and harrow, | 11 00 |
| | hoes, rakes and other tools, | 30 00 |
| | grindstone, | 5 00 |
| | baskets, | 4 00 |
| 75 | bushels of corn, at 90 cents, | 67 50 |
| 15 | bushels of rye, at 1 dollar, | 15 00 |
| 100 | bushels of potatoes, at 40 cents, | 40 00 |
| 12 | tons of hay, part salt, | 120 00 |
| 30 | bushels of mangold beets, at 30 cents, | 9 00 |
| | Family stores, including beef, pork and hams, | 45 00 |
| | | $3,691 50 |

To go through the year would take too much space and time, and as it is my purpose simply to give a specimen of what should be done, I will give a memorandum for two weeks only, one, the first week of the farm year, and the other, the first week in September.

### *Memorandum or Journal.*

Tuesday, April 1st, 1862. Have this day taken an inventory of my farm and what is on it, which is worth at the market value, $3,691.50.

Charles Driscoll, whom I engaged one month ago, commenced work, and is to receive $180 per year.

Wednesday, 2d. Sold 22 bushels of potatoes, at 50 cents; bought 1 pound tea, at 80 cents, 1 gallon molasses, at 42 cents.

Thursday, 3d. Engaged William Barry for seven months, at $17 per month, to commence next Monday. Purchased $8 worth of grass seed and 1 shovel.

Friday, 4th. Sold one calf for $7.50, and laid down two acres of land, sowing grass seed and summer rye.

Saturday, 5th. Bought two bushels of summer wheat, at $1.50, and one bushel of barley, at $1.25, to sow, and sold eight dozen eggs, at 14 cents.

Monday, 7th. William Barry came as agreed—sowed the wheat and barley and grass seed, rolling the ground. Planted an acre of early potatoes. Sold one steer for $26, two bushels of rye, at $1, and fifteen bushels potatoes, at 55 cents. Bought

$20 worth of ashes, part to be used with plaster in the hills of potatoes and corn, and part to be used in raising turnips.

Monday, Sept. 1st, 1862. Sold thirty-three pounds pork, at 12 cents and received the value in groceries.

Tuesday, 2d. Sold twenty-two chickens at 40 cents, three bushels potatoes at 80 cents, and six dozen eggs, at 15 cents.

Wednesday, 3d. Paid $1.75 for mending harness, $6 to William Barry. Sold two bushels onions, at $1.25, thirty pounds cheese, at 9 cents, and one ton of straw, at $8.

Thursday, 4th. Went to market, and sold apples, butter, potatoes, onions, cheese and eggs, amounting in all to $24.56.

Friday, 5th. Sowed two acres to winter wheat. Bought nine pounds beef, at 11 cents.

Saturday, 6th. Bought one pair of oxen and three steers, for $160, to be paid for in two months. Sold four pigs, at $3, and twenty-two pounds butter, at 28 cents.

Corresponding with this memorandum is the cash book or farm account, in which the farm is debited or charged with all expended for it and credited with all received from it:—

| Dr. | Farm. | |
|---|---|---|
| 1862. | | |
| April 2. | To tea and molasses, | $1 22 |
| 3. | grass seed, . . . | 8 00 |
| 3. | shovel, . . . . | 80 |
| 5. | wheat and barley, | 4 25 |
| 7. | ashes, . . . . | 20 00 |
| Omitting till first week Sept. | | |
| Sept. 1. | To groceries, . . . | 3 96 |
| 3. | mending harness, | 1 75 |
| 3. | Wm. Barry, wages, | 6 00 |
| 5. | beef, . . . . . | 99 |
| | | $46 97 |
| | Balance on hand, . . . | 80 88 |
| | | $127 85 |

| | Farm. | Cr. |
|---|---|---|
| 1862. | | |
| April 2. | By 22 bush. potatoes, at 50 cents, . . | $11 00 |
| 4. | one calf, . . . | 7 50 |
| 5. | eight dozen eggs, | 1 12 |
| 7. | one steer, . . . | 26 00 |
| 7. | rye, . . . . . | 2 00 |
| 7. | potatoes, . . . | 8 25 |
| Sept. 1. | pork, . . . . | 3 96 |
| 2. | chickens, . . . | 8 80 |
| 2. | potatoes, . . . | 2 40 |
| 2. | eggs, . . . . | 90 |
| 3. | onions, . . . | 2 50 |
| 3. | cheese, . . . | 2 70 |
| 3. | straw, . . . . | 8 00 |
| 4. | butter, vegetables, &c., . . | 24 56 |
| 6. | pigs, . . . . | 12 00 |
| 6. | butter, . . . . | 6 16 |
| | | $127 85 |

Thus, keep an exact account of all received and paid out through the year, footing up each page as it is filled.

*Inventory of my Farm, Stock, &c., April* 1, 1863, *one year from the time the last Inventory was taken.*

| | | |
|---|---|---|
| | Farm. Worth about the same as last year, the land and fences better, but the buildings not as valuable, | $2,500 00 |
| 1 | horse, | 75 00 |
| 4 | oxen—sold one yoke for beef, and bought another, | 180 00 |
| 4 | cows, | 160 00 |
| 1 | calf, | 8 00 |
| 3 | steers, | 75 00 |
| 2 | heifers, two years old, | 60 00 |
| 40 | hens, | 15 00 |
| 4 | hogs, | 45 00 |
| 1 | express and one riding wagon, | 105 00 |
| 1 | ox wagon and one cart, | 55 00 |
| | harnesses and yokes, | 50 00 |
| | ploughs and cultivator—one plough, just bought, | 30 00 |
| | ox sled and chains, | 8 00 |
| | spades, shovels and forks, | 10 00 |
| | corn sheller and harrow, | 10 00 |
| | grindstone, | 5 00 |
| | horse rake, just purchased, | 8 00 |
| | baskets, | 4 00 |
| 60 | bushels of corn, at one dollar, | 60 00 |
| 18 | bushels of rye, | 18 00 |
| 80 | bushels of potatoes, | 48 00 |
| 12 | bushels of barley, | 15 00 |
| 20 | bushels of wheat, | 35 00 |
| 15 | tons of hay—part salt, | 150 00 |
| 50 | bushels of turnips, | 12 50 |
| 25 | bushels of mangold beets, | 6 25 |
| | Family stores, | 60 00 |

| | |
|---|---|
| From the value of the inventory of 1863, | $3,807 75 |
| Take the value of the inventory of 1862, | 3,691 50 |
| | $116 25 |

| | |
|---|---|
| To this add all that is received from the farm for produce, as per cash book, | $1,186 26 |
| | $1,302 51 |
| Farm expenses, including repair of buildings, labor, taxes and everything expended for the year, as per cash book, | $926 58 |
| Interest on farm for one year, value as in inventory, | 221 49 |
| | $1,148 07 |

| | |
|---|---|
| From all that is received from the farm, | $1,302 51 |
| Take all that is expended for the farm, | 1,148 07 |
| And it will show the *net income*, | $154 44 |

(over interest which might have been obtained for cash value of farm) which is received for the services of the owner and family, besides their board, with which to pay for clothing and all personal expenses.

It is advisable to keep an account of some of the separate crops, in order to find how much it costs to raise a bushel of corn, rye or onions, a ton of hay, or any crop that is raised.

A page in the last quarter of the book may be devoted to each crop. The following may serve as a specimen :—

| | | | | |
|---|---|---|---|---|
| Dr. | | | Cornfield No. 2—West of House. | |
| April | 18. | To | manure, | $35 00 |
| | 19. | | drawing manure, | 4 00 |
| | 20. | | ploughing and spreading, | 3 50 |
| May | 1. | | harrowing, | 1 00 |
| | 2. | | seed corn, | 30 |
| | 2. | | plaster and ashes—in the hill, | 75 |
| | 2. | | furrowing and planting, | 1 50 |
| June | 1. | | cultivating, | 75 |
| | 1. | | hoeing, | 2 00 |
| | 27. | | cultivating, | 75 |
| | 27. | | hoeing, | 2 00 |
| Oct. | 23. | | harvesting, | 3 00 |
| | 25. | | harvesting, | 3 00 |
| | | | Interest on land and taxes, | 2 00 |
| | | | Whole expense, | $59 55 |

| | | |
|---|---|---|
| Expense brought forward, . . . | | $59 55 |
| Cr. | | |
| By 48 bushels of corn, at 90 cents, | $43 20 | |
| 5 bushels small corn, . . . | 3 00 | |
| stover, . . . . . | 8 00 | |
| | | $54 20 |
| | | $5 35 |

Leaving an apparent loss of $5.35, but in reality a small gain, as the land is improved more than that amount.

It is said that farmers are more slack in their payments than most other business men ; it is true they generally pay in time, but they are often short of money, and get trusted for what they buy, thus keeping always in debt. This ought not so to be, and a little system in keeping an account of the income and expenses will have a favorable influence in assisting them to keep out of debt.

In order that every record may be accurate, it is necessary that it be attended to each night, while fresh in the mind. A small book in the pocket, or a slate and pencil hanging in some convenient place, may assist in retaining the principal facts and figures, until they can be transferred to their appropriate places.

Marshfield, Nov. 25, 1863.

## PLAN OF A BARN.

### PLYMOUTH.

Walk with me to the top of that graded way—some seven or eight feet, perhaps, above the level of the surrounding ground—and there, opening the large barn-door, fronting east, and entering on the floor-way for the reception of vehicles with loaded hay, which extends through the length of the barn, note that the lengths of the bays on each side are equal to the floor, and some sixteen or eighteen feet high, as may be desired, and on the same level with the floor, except the right hand one, the floor of which is two feet higher than that upon which we stand.

Now for proposition first: with regard to keeping the hay. What is required in regard to keeping the hay? We suppose the requisites will be, 1st, convenience of storage; 2d, a good, well-covered barn; and 3d, proper ventilation.

First, let us consider convenience of storage. That the storage room is clear and spacious we can observe at a glance, and, what is very desirable in the haste of storing, that much of the pitching of the hay is down, and not up, and that all the room is most convenient of access. The size of the storage rooms (of the plan) is thirty-four by fifty.

We suppose a good covering for a barn to be, first, a good quality of boards; and next, a good covering of shingles and clapboards, the clapboards to be well painted, of course.

The next requisite is, good ventilation. We have drawn a cupola, or ventilator, on the top; and we propose glazed windows, for the purpose of sight-seeing, and to protect from the weather; and also to protect the windows with blinds, so that if the window is left ajar for ventilation, the falling rain may not so immediately and copiously enter and defeat the intention of ventilation.

The next proposition to consider is, the comfort of the creatures. They too must be conceded to demand good protection from the inclement weather, and good ventilation. This we think we have attained by placing the cow, horse and ox stalls on the floor below; the cow stalls being ranged immediately under the threshing floor, or floor for bringing in hay, from which the hay is to be let down to the cows. The horse and ox stalls are ranged at a right angle with the cow stalls, at the farther end of the barn, and at the left hand from where we first entered. The horses, it will be seen, may stand on the ground. We propose to mention here, as being conducive to the comfort of the cattle, three original improvements which are proposed to that end. We will notice first, an adjustable platform for cows or oxen to stand or repose upon. These platforms may be so adjusted at pleasure as to accommodate the length of the creature. Second, a new mode of forming the crib, which, in our plan, extends to the upper floor and one foot or more above. It may also be fitted with a covering for the creature's head, and a partition to convey the feed down if desired. The mode of fastening is to a chain which runs upon an iron rod whose ends are inserted in cast-iron sockets. Our third improvement, is a movable lattice platform for voiding the urine. This platform is situated behind the animal, and about five inches lower than the adjustable platform. The object is to keep the creatures perfectly dry and clean, and to afford a good, commodious chance to pass behind them; also, when the platform is turned up on one edge, as it may be as represented in one of the figures of the plan, it affords a commodious chance to convey into or out of the vault such things as may be desired to absorb and retain the manure.

The stalls are most completely closed in from the weather, and draughts of air, except when it is desired for ventilation; which may be accomplished by opening the various doors to the apartments, such as may be desired, and by openings into the carriage house, as hereinafter indicated.

We will consider now, if you please, the ease and convenience with which the animals may be tended. At the right hand of our entrance, on the reception floor for hay, by the side of the floor, is situated the top of the cribs for feeding the cows. The top of the crib in front rises about one foot from this floor, and the back of the crib may be on a level with the hay floor, which is raised a little, as already stated, for the purpose of giving height to a carriage room beneath. Into these cribs you can look or deposit your feed at your ease and pleasure.

The ox and horse stalls are situated in the same way, in regard to the plane of this floor, the cribs being on the end of the barn, with a passage-way for feeding the cribs from above. At the farther end of the hay floor, close by its side and in the same range as the cribs for the cows, is situated the stairs, which we will descend from the west end, coming down easterly to the floor below. At the foot of these stairs we stand in a passage, running across the foot of stairs, leading from the tool and wagon room on your left to the stalls for oxen and horses to the right. At the farther end of this passage are the horse and ox stalls, on the opposite corner of the back end of the barn. At the left, as we turn down this passage, is an opening into the cow leanto. On the right is a room for roots, running under the stairs, and under the west door of the barn above. Just by the foot of the stairs is a trough for watering horses and oxen, if you please, which may be unyoked, or unharnessed, and enter this passage from the room for tools, wagons, &c. This room runs the entire length of the barn and in front and north of the cow stalls; a portion of it may be one story in height, forming a lean-to corresponding with one on the opposite end of the barn; from which room all of the cow cribs can be examined by means of a slide door on their backs, and at which they may be fed with any thing desired; also, these doors may be left open if it is desired to ventilate. From the passage at the foot of the stairs we will pass into this room for the reception of tools and wagons. At each end of this room, on the east and west ends of the barn, is a large door for ingress and egress. By the east door of this room is a door leading into a passage by the cow leanto; this passage is immediately under where we first entered the barn, and runs south by the east wall. Passing down this passage we come at the door for receiving the cows from the barnyard. The yard comes up to the graded way that leads to the floor above. Here, by this door and from a reservoir which serves to fill and make up this graded way, you may water your stock at pleasure, without the aid of pump or bucket, but by simply letting the water run which you have collected from the roof of the barn, as they say that during the year the rain will cover it thirty-six inches deep. This water we propose to retain in two reservoirs, one at each end of the barn, in graded or raised ways to the hay-loft floor. The oxen or horses can be let into the barnyard, to come at water at this place, from their stalls, by means of a door entering the yard at the south end of their leanto.

Having shown how to store the hay and tend the creatures, we propose to pass now to the consideration of preserving and making manure.

Here let me say, in the language of the poet,

> Though our store of wealth is small,
> 'Tis prudence to enjoy it all.

All, therefore, both liquid and solid, that we can, it is best to retain for use. I, therefore, propose a vault, four feet or more in depth below this floor, cemented on the bottom and sides with water cement, into which shall fall all the liquid and solid manure; and there to retain its essential parts by means of loam, muck, plaster, or straw, until it may be removed; protecting it in full from drenching rain or scorching sun, by means, in part, of a lean-to, and partly by the body of the barn itself, which covers a part of the manure vault. This manure vault is twenty-eight feet square, and so situated that all the urine from all the creatures shall immediately fall into it, and not be left to evaporate as on a tight floor over a cellar. This precipitation of the urine is effected by the lattice platforms.

By the side of this vault, on the right of the passage last mentioned and at the end of it, and at a convenient point of access, is a pen for feeding swine, which may run in this vault to protect the manure from fire-fang, which they will do in a most complete manner. Near this pen for swine, on the right of the same passage, next to the hog pen and between it and the cow leanto, is a pen for calves with lattice floor to void the urine. The calf pen extends over the passage of one of the doorways leading to the manure vault, but not in such a way as to prevent the most convenient entrance of the cows. This pen may be raised by means of fall blocks, whose rope may be attached to a windlass situated in the cow leanto, the rope being directed to it by means of shive-wheels; and by the same means can be raised all the lattice platforms in a most convenient and satisfactory manner. The lattice platforms may be turned on their sides. The calf pen may be run upon the top of the pen for swine, and there remain for any desired time. When the calf pen is removed there will be access in two ways to the manure vault; a team may drive in at one end and out at the other.

I submit this as a partial description of a plan of a barn, presented by me at the cattle show at Bridgewater, Oct. 1st and 2d, 1863. This plan I deem, for many persons, quite full, complete and convenient; as it contains all the house room that usually would be desired; as it provides a closed room for family carriages, harnesses, and the most of the room usually wanted in out-buildings.

I do not profess to know all about manure. Neither, from all that I can learn, do I suppose there are any that do understand all about it. This thing is a subject for close investigation, and farmers cannot be too studious in the pursuit of such knowledge. But, in the meantime, we should use all the known means to retain the virtues of manure and not leave Miss Ammonia to "skedaddle;" but as every thing in nature seems to be free, our policy should be to present her with greater attractions. For the purpose of making manure I propose to save all that can be saved of liquid and solid manure, and for this purpose propose to use cemented vaults, precipitating into them both solid and liquid substances that have the desired quality, and there adding as many things to absorb and retain the valuable properties of manure as possible. Let every one, therefore, whatever their means may be, look to the preservation of their manure. Even if they have no stock let them have a cemented vault for the liquids and substances from the house. If they have cellars, let their bottoms and sides be cemented, and let them be protected, upon all sides, from the weather. In order to effect this completely, in most cases it would require that a close shed, or lean-to, be built on the open side. This would prevent the draught of air through an open floor behind the creatures, in some measure, which open floor is essential to void the urine, but must be secured against excessive cold or draught. If they have no cellar, let them adopt my plan of a vault and shed, or lean-to.

Inasmuch as I learn that the plans will not probably be printed, I annex such a description as will enable any one to form the plans of the lower and upper floors for themselves.

Mode of forming the plan and description of the parts:—

Draw a parallelogram, in length, north and south, sixty feet, (60 feet,) in breadth, east and west, fifty feet (50 feet.) These are the outside wall lines of the lower floor.

Twenty-four feet from the north line, from a point on the east line, draw a line, parallel with the north line, to the west line. The last formed line constitutes the south side of the tool and wagon room. Place two doors, nine feet six inches in width, one on the east wall line, the other on the west, bringing their south jambs near to the partition line. From a point in the east line, ten feet from the north wall line, draw a line parallel, west, twenty-five feet, and from thence, north, ten feet, to the wall line. This partition will constitute the family carriage room. Place the door to it on the east wall line. Place a small door in the south partition line, so that this room may be entered from the tool and wagon room. From a point in the east line, twelve feet south of the south partition line of the wagon room, draw a line parallel to it, to the west wall line.

Thirty-six feet of the east portion of this twelve feet division will constitute the place for the cow stalls. Place the cribs with their backs to the north line partition, placing the first crib thirty-six feet from the east wall line, dividing them eastward, giving four feet to each crib.

From a point in the south line of the cow stalls, fourteen feet east from the west wall line, draw a line parallel to it to the south wall line. This enclosure, fourteen by twenty-four, will constitute the place for the horse and ox stalls. Place the back of their cribs to the west wall line, placing the horse stalls at the north end of the apartment, two in number. The top of the ox cribs will be under the shed roof.

From this apartment make a door, four feet in width, in the south wall line, placing the east jamb against the east or partition line. This door will open to the barn-yard.

From a point on the south line of the cow stalls, twelve feet west of the east wall line, draw a line to the south wall line. Seven feet east of this line draw a parallel line from the cow stalls to the south wall. Of this enclosed parallelogram, seven by twenty-four, make twelve feet of the north part into a calf pen.

Twelve feet of the south end devote to swine. On the east side of these apartments there will remain a passage, five by twenty-four, running from the cow stalls, by the east wall line to the south wall line.

On the east wall line, two feet six inches south of the south cow stall line, place the north jamb of a door, nine feet in width. By it admit the cows from the stalls to the barn-yard. Also, remove the calf pen, and you have admission to the manure vault.

The manure vault you have enclosed, on the south by the south wall line, in the centre of which place a door, twelve feet wide, as the common entrance to the vault. This door opens direct into the barn-yard. On the west line of this vault are the horse and ox stalls; on the north, are the cow stalls; on the east, are the calf and pig pens. Make the bottom of this vault at least four feet lower than the surrounding floors. On the west side of this vault carry up a perpendicular face wall, from the bottom of the vault to the back end of the platforms upon which the oxen and horses stand, i. e., to the back end of the adjustable platforms. The space between the ends of these platforms and the line designating the partition line of the stalls is covered with a lattice platform, whose top is five inches lower than the top of the adjustable platform. Each creature is supplied with an adjustable platform, so as to accommodate the length of the creature, by drawing forward or sliding back the platform at pleasure. The lattice platform is four or more feet wide, as the case may require, and twelve feet long, two being therefore required for the twenty-four feet allowed for oxen and horses, the inside edge, or part next the animals, being made of narrow planks, with open joints, so that the urine may fall immediately into the vault. They are made to turn up on the inside edge, the side nearest the animals, by means of a tackle. When they are turned up, loam, peat, plaster or straw, or whatever you wish to absorb and retain the qualities of the manure, may be placed beneath them. In short, you may cast in and out from under them as conveniently as from any other part of the vault. The north side of the vault, next the cows' stalls, is constructed in precisely the same way. Therefore the vault, in fact, is twenty-eight or more feet square, instead of twenty-four, as it seems to be, as you strike the partition lines on the plan, (as it is extended four or more feet west and north) under the lattice platforms.

The bottom and sides should be cemented. As the pig pen is situated by a portion of the east side of the vault, they can conveniently run in it, protecting the manure from fire fang. And as the calf pen constitutes a portion of the east side of the vault, and covers the way to it, the drainage from that will fall into it, and that without waste, as it has a lattice floor. As to the height of the vault, it reaches to the second floor, so that it is eleven feet deep, or more. You can fill it four feet deep with manure and still drive a team over it, providing your manure lays solid enough.

At the west end of the cow stalls there is a remaining portion to dispose of. From a point in the north line of the cribs, nine feet six inches from the west wall line, draw a line parallel with the west wall to the horse stalls. From a point three feet south upon this line draw a line parallel with the north line of the cow stalls to the west wall. This space, three by nine and one-half feet, is the site of the stairs. The portion inclosed, nine and one-half feet by nine, is the root room, in front of which, the space remaining in a line with the adjustable platforms of the horse stalls, and running across the end of the cow stalls, four feet six inches by twelve feet, is the passage from the tool and wagon room to the horse and ox stalls. From this passage there is a door entering the root room. By the side of this passage, at the foot of the stairs, is the watering trough, which is set into the space allotted to the root room, and supplied from the west reservoir, back of the root room.

Ascending the stairs, from this passage, we land against the west wall of the barn, and by the north side of that portion of the barn floor that lays directly over the cow stalls, the cow stalls being under the threshing floor of the barn.

To draw the upper floor, draw a parallelogram, as directed for the lower floor, fifty by sixty feet, placing the point of the compass in the same way, parallel with the north line. Draw a line across the plan, fourteen feet south of it. This line will constitute the northerly wall line of the building, on the second floor. Across the plan, twelve feet north of the south line, draw a line. This line will constitute the south wall line of the building, on the second, or upper floor. The portions to the north and south of this floor are the sites of the north and south shed roofs. Draw a line across the plan ten feet south of the north wall line of the second floor, and you have the back line of the top of the cow cribs. Two feet and six inches south from this draw a parallel line across the figure, and you have the south line of the top of the cow cribs, and the north line of the floor that constitutes the passage through the barn from east to west, or threshing floor. Ten feet south of this line draw a parallel line across the figure, and you have the plan of the passage floor. Place a door at the east and west end of this floor, each ten feet in width, and place windows in each door. There should be windows, two in each gable. Build a ventilator at the centre of the roof. In storing hay upon the south side of the ten feet floorway, care should be taken to leave a passage by the top of the cribs that stand by the west wall, so as not to interfere with feeding. This story of the barn should be sixteen or eighteen feet high, and appropriated to the receiving and storing of hay and feed. The floor for storage of hay, on the north side of the top of the cow cribs, is raised for the purpose of clearing the tops of carriages that enter the wagon and tool room below.

In order to reach the doors of the upper floor, with a loaded team, there must be graded ways raised against the east and west ends of the barn, to the level of this floor. In each raised way construct a reservoir. Make the width of the ways fourteen feet, and support their sides with a face wall.

On the south side of the east way place a trough for water in the barn-yard. To find the place of these ways, on the ground plan, place their north sides six inches south of the back line of the cow cribs.

To remove the calf pen. Let there be a flat bar of iron suspended horizontally with the upper edge, six inches below the second floor. Make the bar twelve feet long. Bring one end directly over the centre of the pen, laying its length in the direction you desire to move, which had better be over the hog-sty. Place on its upper edge a channelled movable pulley, to which suspend a hook. To this hook your tackle. Raise your pen to the desired height, and roll the pulley forward upon the bar to the desired point.

JOSEPH HAYWARD.

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